Proposed Design of a Two-Storey Sangguniang Kabataan Building with Local Youth Development Council Office in Lambunao, Iloilo

A Project Study

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ABSTRACT

José Rizal believes that the youth is the hope of our future. Although, without proper guidance and the lack of support in nurturing their potential, they too will cause an issue for the society. The Sangguniang Kabataan prioritizes the youth's development. Thus, a two-storey Sangguniang Kabataan (SK) building with a local youth development council office was proposed. The proposed structure will be located at the available space near the New Government Center with a lot area of approximately 732 sq. meters in Lot 22-B Ladrido Street, Lambunao, Iloilo. The building is consist of primarily for Sangguniang Kabataan and the Local Youth Development Offices which also involves a space allocated for the Public Library for Lambunao and Teen Center.The National Structural Code of the Philippines (NSCP) 2015, American Steel Institute (ASI), American Standard for Testing and Materials (ASTM), American Institute of Steel Construction (AISC) 360-10, and American Concrete Institute (ACI) 318-14 were used to design the structural members. For the schedule of construction activities, the Program Evaluation and Review Technique and Critical Path Method (PERT-CPM) were used. Green building technologies are integrated in the design of the proposed project namely: Natural lighting, sound-attenuating laminated panes, green walls, and metal and polycarbonate roof. The estimated project cost was PHP PHP 18,044,902.68, with a 198-day estimated project duration. The budget is funded by the municipality of Lambunao as projected in their Annual Investment Plan (AIP). Installation of CCTV cameras in the building, an assigned electrical room for power generator, and constant maintenance of the building are recommended.

Chapter I

Introduction

1.1 Background and Rationale

The Sangguniang Kabataan (SK), also known as the Youth Council, embodies the active involvement of young people in local governance. It plays a crucial role in societal matters, particularly in promoting and participating in Peace and Order Projects within the community. The SK governs the youth assembly in every barangay, aiming to enhance the overall development of young individuals in various aspects such as social, political, moral, economic, cultural, and to improve their strength of mind, body, and spirit. This organization was established in accordance with the 1987 Constitution, as further explained in R.A. 7160, commonly referred to as the Local Government Code. It signifies the Philippine Government's acknowledgment of the potential of children and youth in contributing to the nation's progress.

Over the past decade, the performance of the Sangguniang Kabataan (SK) has generally been weak in various aspects such as legislative initiatives, promoting youth development, submitting reports, and engaging with constituents. This finding was derived from a study conducted by Ong et al. in 2007. However, the study also revealed the notable strengths of the SK and its potential to cultivate a new generation of leaders who actively participate in the community, particularly among the youth, while instilling values of accountability, honesty, and creativity. The research indicated that engaging in governance helped young people develop confidence and enhance their leadership skills at the local level, empowering them in the process. SK officers gained valuable experiences that prompted them to reflect on their surroundings, learn new skills, and develop a sense of responsibility and accountability for their actions. Additionally, they were able to establish connections with their peers and adults.

The SK was specifically responsible to facilitate these outcomes. In local government councils, SK officers speak for the young and have the same rights and responsibilities as regular council members. Their specific functions include promulgating resolutions necessary to achieve the youth's objectives in the barangay, initiating programs to enhance various aspects of youth development, conducting fundraising activities, consulting, and coordinating with youth organizations for policy formulation and program implementation, as well as coordinating with appropriate agencies to implement national-level youth development programs..

Youth participation provides teenagers with the opportunity to exercise their rights and be recognized in a platform that values their contributions. It is guided by the principle of active involvement, which promotes personal development and community engagement among young individuals. The Local Youth Development Council (LYDC) plays a crucial role in facilitating this participation and recognition. Enshrined in Republic Act No. 10742, also known as "An Act Establishing Reforms in the Sangguniang Kabataan Creating Enabling Mechanisms for Meaningful Youth Participation in Nation-Building, and for Other Purposes," this legislation mandates provinces, cities, and municipalities to establish a Youth Development Office. Section 25 of the act highlights the importance of the Youth Development Office in upholding and protecting the youth's right to participation by providing them with appropriate platforms and guidance through a youth development officer.

Chapter III, Section 23 of RA 10742 mandates the creation of Local Youth Development Councils (LYDCs) in every province, city, and municipality in order to further improve youth participation in local governance. Representatives from youth and youth-serving organizations at the relevant levels make up these councils, which are referred to as the Provincial Youth Development Council, City Youth Development Council, and Municipal Youth Development Council, respectively. The Sangguniang Kabataan and the Pederasyons at all levels receive assistance from LYDCs in organizing and carrying out projects and activities, ensuring that the

young are well-organized and guided to actively participate in efforts for their welfare and general development.

Active participation in the community and society enables the youth to unlock their potential and develop into responsible adults. The Youth in Nation-Building Act, officially known as Republic Act No. 8044, supports young individuals between the ages of 15 and 30, as reported by the Philippine Statistics Authority, in nurturing their capabilities and talents as they grow. This legislation serves as a means to support and empower young minds as they contribute to the progress of the nation.

A first-class municipality in the Philippine province of Iloilo, Lambunao is formally known as the Municipality of Lambunao. There are 81,236 people living there as of the 2020 census and shown in Table 1 is the different age group of youth in Lambunao. With its expansive land area, Lambunao holds the distinction of being the largest municipality in Iloilo, located approximately 47 kilometers (29 miles) away from Iloilo City. The residents of Lambunao have garnered various accolades in sports, earning the municipality a reputation as a hub for sports enthusiasts. Recently, Lambunao National High School entered into a Memorandum of Agreement (MOA) to implement a varsity program aimed at achieving sports excellence. In an interview with one of the varsity coaches, it was emphasized that the establishment of a Sports and Development Office is imperative to fulfill their ultimate objective of nurturing every child into a sports champion.

On the other hand, Lambunao is one of the municipalities in the Province of Iloilo that has high cases of suicides and teenage pregnancies as showned in Table 2 and Table 3. These cases are very alarming and should be given priority in finding a solution. Teen centers can be instrumental in addressing these issues, especially for the youth in the Municipality. They can serve as a valuable resource for information, assistance, skills building, and even provide a safe space for recreation and amusement.

Table 1

Data Table of Lambunao Youth Population

Youth Population of the Municipality of Lambunao Ages 10-30 Years Old			
Categories	Male	Female	Total
In School	9661	9241	18902
Out of School	7183	6487	13670
TOTAL	16844	15728	32572

Table 2

Number of cases of teenage pregnancy from rural health unit of Lambunao, Iloilo

Cases of Teenage Pregnancy	
Year	Number of Cases
2019	296
2020	396
2021	291
TOTAL	983

Table 3

Number of suicide cases from municipal police of Lambunao

Suicide Cases	
Year	Number of Cases
2021	5
TOTAL	5

Development Center Office in Lambunao, Iloilo will be located at the available space near the New Government Center with a lot area of approximately 732 sq. meters in Lot 22-B Ladrido Street, Lambunao, Iloilo. The building comprises primarily for Sangguniang Kabataan and the Local Youth Development Offices which also involves a space allocated for Public Library for Lambunao and Teen Center as this focuses on the main purpose of the study, to formulate, plan, and to execute programs that will benefit the Sangguinang Kabataan federation and general of local Lambunaonon youth.

In addition, an office space will be assigned in the floor plan of the proposed project. The office space is basically for the use of, but not limited to, SK Chairpersons for their meetings and/or sessions and also for the representative of each accredited organizations that are part of the Local Youth Development Council, as long as the participants fit in the room. The building will also have a space-for-rent in order to make the building profitable.

Table 4

Number of Participants in a meeting/session

ORGANIZATIONS	NUMBER OF PARTICIPANTS
Sangguniang Kabataan Chairpersons (SK Federation)	72
Local Youth Development Council	16
Total	**83**

The office space should accommodate at least 83 people, as presented in Table 4, with a 20 percent margin since there are meetings for the LYDC and SK chairpersons.

83*0.2 = 16.67 or 17

83 + 17 = 100 People

There are no existing offices for SK and LYDC and as presented in the figure 3, there are different organizations that collaborate with LYDC and programs to be executed by the

organization. A list of programs and activities are formulated and planned by the Sangguniang Kabataan committee that regular meetings are conducted every month. In relation to the general welfare of the youth, it is determined through investigation that there is no public library and only three teen centers- school based, in Lambunao. As further investigation, the DSWD calls for an educational center in Lambunao which urged the researchers to design the offices which involve the youth's welfare.

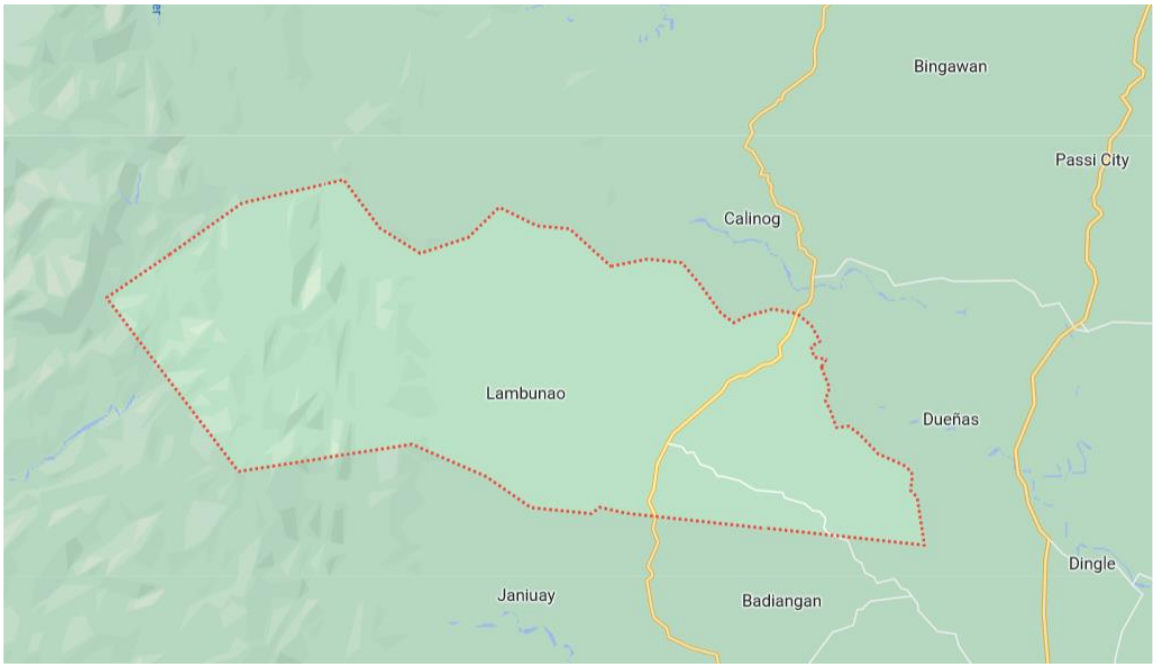


Figure 1

Map of the Municipality of Lambunao

An educational center is essentially an institution dedicated to education. There are various types of educational centers, each with distinct characteristics. These include professional centers, educational centers that are closed, and others. As seen in Table 5 and Table 6 are the list of educational centers such as High Schools and Universities in Lambunao The United Nations Educational, Scientific and Cultural Organization (UNESCO) and the International Federation of Library Associations (IFLA) both define a public library as a facility

that is created, maintained, and funded by the local community. Government agencies on the municipal, regional, or federal levels as well as other civic organizations may provide this assistance. A public library's primary goal is to make knowledge, information, and creative works accessible through a variety of tools and services. It is intended to be equally accessible to all community members, regardless of their color, nationality, age, gender, religion, language, ability, level of education, or employment or economic situation. A public library exists to serve a community and is referred to as a "democratic equalizer" since it is accessible to everyone and provides information that can improve the lives of individuals, families, and communities (Scott, 2011).

Table 5

List of High Schools within Lambunao

List of High Schools		
	Name of Schools	Address
Public	Lambunao National High School	Brgy. Poblacion Ilawod, Lambunao, Iloilo
	Caninguan National High School	Brgy. Caninguan, Lambunao, Iloilo
	Panuran National High School	Brgy. Panuran, Lambunao, Iloilo
Private	Jayobo Farm School	
	Harvestfield Christian School	Brgy. Poblacion Ilawod, Lambunao, Iloilo
	Harvester Christian Academy	Brgy. Poblacion Ilawod, Lambunao, Iloilo
Integrated	Pandan Integrated School	Brgy. Pandan, Lambunao, Iloilo
	Pughanan Integrated School	Brgy. Pughanan, Lambunao, Iloilo
	Daanbanwa Integrated School	Brgy. Daanbanwa, Lambunao, Iloilo
	Lanot Grande Integrated School	Brgy. Lanot Grande, Lambunao, Iloilo
	Bagongbong Integrated School	Brgy. Bagongbong, Lambunao, Iloilo

Table 6

List of Universities within Lambunao

List of Universities		
	Name of Schools	Address
Public	WVSU- College of Agriculture and Forestry (Main Campus Extension)	Brgy. Jayobo, Lambunao, Iloilo
	WVSU- Lambunao Campus	Brgy. Poblacion Ilawod, Lambunao, Iloilo

Since the other Municipalities already have Sangguniang Kabataan (SK) Building/Office, the researchers would like to integrate the SK and LYDC office where the youth center is included where these offices will work together to address such youths' struggles and challenges and for a progressive youth development and involvement (example shown at Figure 2). And also, since the government center of Lambunao has no enough office to offer for the SK and even the LYDC, having this proposed Two-Storey Sangguniang Kabataan Building with Local Youth Development Center is the solution to the problem.

Figure 2

Palaro that is implemented by SK Federation and LYDC in Lambunao, Iloilo for the year 2022.

The Sustainable Development Goals, also known as the Global Goals, are a set of 17 interconnected international objectives that are intended to serve as a "common blueprint for peace and prosperity for people and the planet, now and into the future." Assuring healthy lives and promoting well-being for all people at all ages; promoting sustained, inclusive, and sustainable economic growth; ensuring full and productive employment and decent work for all; making cities and human settlements. These goals helped the study to pursue such changes that the researchers are aiming to achieve.

For three consecutive years from 2017-2019, the Municipality of Lambunao garnered the Seal of Good Education Governance from Synergeia Foundation and USAID. Having these offices/facilities could help the education system of the municipality considering it has 2 universities, 13 integrated, public and private high schools, and not including the elementary schools. This could give an avenue for the students to learn even outside their homes and schools, and could strengthen the education sector.

1.2 Identification of the Problem

No SK and LYDC Office. There is no existing space for the SK Federation, Sports and development offices, and the LYDC Offices where the Youth leaders, Youth organizations and SK leaders in the Municipality of Lambunao to perform their administrative work in order to support and achieve the objectives and goals of Sangguniang Kabataan Federation and its Local Youth Development Council of Lambunao along with the support for the sports' recreational activities and events. Because of the non-existing working space for the organizations to gather and plan, the multi-purpose gym and the conference room that the municipality of Lambunao provides are the only option to conduct the business but the problem is, the officers are not the only ones in the gymnasium which there are certain circumstances

that cannot be avoided such as, unnecessary noises which makes it hard to discuss the agendas and planning for the future activities of the organization, and the conference room within the municipal hall is not always available and must undergo the process of reservation where the organization must have a permit because it is also being used by other organizations and with the demand of the mentioned organizations that office is needed not only to plan but as well as to do administrative work which a working space is needed as much as possible 5 days a week, unless, the youth officers are going to rent a space which will be at the expense of the organization or the youth members (Figure 3).

Figure 3

Youth leaders and SK Chairpersons conducting meetings at a paid location in Lambunao

Organizations that aim to create, plan, and manage programs for local youth are required to hold regular meetings. The Joint Memorandum Circular No. 2017-01, released on June 23, 2017, by the National Youth Commission (NYC), the Commission on Elections (COMELEC), and the Department of the Interior and Local Government (DILG), details this requirement. Organizations must hold regular meetings as often as necessary, according to the programs set by the Sangguniang Kabataan (SK) and the committee of the Local Youth Development Council (LYDC), according to Section 28 of the circular. Republic Act No. 10742, which is concerned with the "Implementing Rules and Regulations" of the aforementioned act,

contains a comparable clause. Meetings and quorum are governed by Rule III, Section 24, sub-section (I), "Meetings and Quorum," which mandates that the LYDC schedule meetings on a quarterly basis as well as when needed.

No existing public library. The Municipality of Lambunao does not have a public library. The only access the students have is browsing through the internet in internet cafes, free wifi in coffee shops, and other establishments that allow them to use the internet at their own expense. however, there are schools that have libraries but have limitations such as: a) only to students under that institution can access, b) only available during weekdays which is a challenge for students who studies and work during weekends, and c) lack of sources such as journals, and other references that may help students academically (Figure 4). According to the data gathered by the researchers, due to the non-existing library in the municipality of Lambunao, the students usually go to coffee shops just to study but having a public library would give them more peace in studying and makes education less expensive. The public library allows students to make use of the sources needed academically and will also provide free use of the establishment's wifi.

Figure 4

Situation of the Library in Caninguan National High School

Limited accessibility. The existing three teen centers in Lambunao are being held only within the school premises which limits the purpose of having teen centers because they only accommodate students enrolled. The organizers for these teen centers are under the rules and regulations of the school which does not allow them to accept students from another school or those of the youth that do not go to school. There are certain instances or events that the school will let the teen centers accommodate youth outside of the school, but it is limited because it is still under the school's rules and regulations that the organizers should abide by the hours and space they are given to conduct an event or an activity for the program for the youth.

Figure 5

One of Teen Center in the Municipality of Lambunao found in a School Premise

Additionally, the current teen centers are under school institutions which limits other teens to access and this lead them to idle around public locations such as plaza, and other establishments that influenced them badly. Peer pressure leads the youth to decide and do activities without thinking of the consequences later on along with its group or friends. In an article published in Philstar Global written by Archie Modequillo on August 29, 2005, "Istambay, Visayan transliteration of the English world, "Stand by" meaning to hang around." Most of the youth idle too much in public places in Lambunao to socialize, meet with friends, and Tiktoks

because of the 2 years being in their homes due to the pandemic, Covid-19. Without proper guidance, “Indolence seems to be a common trait among istambays,” he wrote, “As soon as they see that they can get through the day just loitering around, that’s it.” This was a common problem with the youth in 2005 and is also a problem with the youth nowadays, and the youth in Lambunao is no exception. A number of cases of with teenage pregnancy was reported in 2021 with about 291 cases with the help of the RHU and 5 cases of suicide in the same year according to PNP in Lambunao. This is also a result of peer pressure without any guidance from adults as shown in Figure 6.

Figure 6

Example of the Youth Idling too much on Public Establishments

The proposed project helped the youth free of unnecessary expense and help them access to establishments where they are able to socialize, plan, and gather for more recreational activities, and to educate and guide the youth with teen centers in providing a new perspective that may help them learn to think about the consequences for every action they make.

Rental spaces for private enterprises such as coffee shops, convenience stores, book stores, or printing services are the target clients for the building in consideration of the main use

of the building that needs a quiet space for meetings and for the public use of the library and the programs that may conduct in the building. The income generated from these rental spaces funded the personal services of the building such as maintenance, security, electrical and water bills, and even plumbing services.

The proposed project was designed to make sure that the client has an income to pay for the utilities and the management of the building and as well as fund the use of the SK and LYDC offices for their administrative works for the development, and welfare of the youth.

1.3 Objectives of the Study

1.3.1 General Objective

The objective of this study was to propose a design of a Two-Storey Sangguniang Kabataan Building with the Local Youth Development Council Office in Lambunao, Iloilo.

1.3.2 Specific Objectives

Specifically, this study accomplished the following:

1. Gather and request necessary local information such as the current situation of the youth of the municipality of Lambunao, lot plans, maps, and others needed for the project study.
2. Conduct geotechnical investigation on the proposed development site and analysis of the data.
3. Identify the technical and design constraints to be considered in plans and technical specifications.
4. Prepare complete design documents such as architectural, structural, electrical, plumbing and fire protection design solutions in compliance with the National Structural Code of the Philippines 2015, Electrical Code of the Philippines and the National Plumbing Code of the Philippines

5. Estimate the total cost of the project.
6. Create project scheduling.

1.4 Significance of the Study

The results of the proposed study greatly benefit the following:

Municipal Engineering Office. This provided the Municipal Engineering Office a possible basis of the design of the two storey of the for the future plan of action by the LGU that may be used for the implementation of the said project.

Municipality of Lambunao. The Municipality of Lambunao provided the finance and the area to be allocated for the project. The construction, operation, landscape design, and maintenance of the youth center and commercial building is considered in the research study and be managed by the municipality.

The Researchers*.* This can be used to implement the knowledge and skills about civil engineering for the design process from experiences and learnings obtained during the on-the-job training, and the school.

Future Research. This has provided the future research information beneficial to other researchers to be compared and served as a theoretical model for the future researchers' studies of the same nature.

1.5 Scope and Limitation of the Study

This study focused on the detailed design of a proposed design of a Two-Storey Sangguniang Kabataan Building with Local Youth Development Council Office in Lambunao, Iloilo located at the available space near the New Government Center with a lot area of approximately 732 square meters. The said design includes the structural, architectural, electrical and plumbing plans. Additionally, this proposal covers the technical specifications, construction work schedules, and cost estimates.

The teen center caters to the needs of the Lambunaonon youths to provide a recreational space to understand, and promote awareness to the social well-being of the people, specifically the youth, and develop competence, leadership skills, and acquire knowledge that may be able to help the community to achieve more.

The Local Government Unit (LGU) of Lambunao, Iloilo is responsible for the financing and provision of the area allocated to this project. With the implementation of this project, it includes the following: the construction, operation, and maintenance of the market and its landscape design. The project design includes utilizing accustomed lighting fixtures, use of windows for natural light and natural air flowing inside the building - which are considered to be green building technology. The water supply was provided by the Local Water Utilities Administration (LWUA), located in Barangay Misi, Lambunao, which filters the water from the rivers of Jalaur and Ulian. These two existing rivers act as the main drainage channels for the area, and the hilly areas help to facilitate the flow of water from the mountains that enriches the plains.

Chapter II

Review of Related Literature

2.1 Introduction

Youth involvement brings numerous benefits to organizations, programs, and the youth themselves. Collaborating with youth in program development increases the likelihood of successful engagement and greater impact among the target population. Youth who participate in decision-making processes that affect them are more likely to accept and adopt such decisions and incorporate them into their daily life. Youth who are given the tools to identify and respond to community needs develop empathy and reflective thinking, which prepares them to carry on this crucial task in the future. Meaningful youth involvement ensures that programs and activities are created with their input rather than just for them by treating young people as equal partners alongside adults in decision-making. A shared vision between adults and children is necessary for this relationship, as is active participation, willingness to change, and these qualities.

The promotion and dissemination of information regarding programs and activities should be led by youth. Young people can be recruited and engaged in these projects more successfully through peer-to-peer communication since their peers can explain the options available and how they were created based on young interests. Youth can also pinpoint appropriate locations where potential participants are likely to be found, like libraries, schools, and recreation centers. Youth participation in governing organizations including library councils, parks and recreation boards, school boards, and even city councils is growing in both rural and urban locations. Many of these leadership organizations give young people full voting rights. Even though some organizations may not grant complete voting rights, they can still give young people the chance to speak up as representatives of their communities.

Retaining adolescents in programs is an issue for organizations and agencies. To ensure that a curriculum is appropriate for a particular age group and population, it can be helpful to involve young people in the review of the materials. Young people can share insights regarding the interests of young people generally with adults who are interested in learning about youth culture. They can lead seminars on the value and application of cutting-edge technology, including web-based social networking, or take part in roundtable discussions to shed light on what it takes to engage today's young in an effective manner.

2.2 Codes and Design Standards

The proposed project's design adhered to the National Building Code of the Philippines (NBCP), National Structural Code of the Philippines (NSCP) 2015, Ultimate Stress Design (USD), and other design standards mandated by the law. It is crucial that the design strictly follows these codes and complies with engineering principles to ensure a safe and secure design.

2.3 Related Literature

2.3.1 SK and LYDC Office.

History of SK and LYDC. The Kabataang Barangay, created by President Ferdinand Marcos during martial law, gave rise to the SK. In order to give young people a chance to get active in community activities and to give the government a way to tell them of its development initiatives, Marcos founded the KB in 1975. Imee Marcos, his daughter, served as chairman. The KB was surrounded by controversy because of its failure to transform adolescents into a responsive collective as well as the application of authoritarian authority among youth. Since then, youth engagement in the KB has declined, with student activism replacing it as the preferred trend in the nation. The National Youth Commission (NYC), National Youth Assembly, and establishment of real youth representation in government were all suggested in a research

on the KB that was completed in June 1986. The administration eliminated the KB after holding youth consultations. Instead of the NYC, the then-president Corazon Aquino created the Presidential Council for Youth Affairs (PCYA), which was effective in working with youth federations to develop future national leaders but lacked the authority of the NYC because it only worked with youth organizations. The technical committee of PCYA and the Congress young delegates worked on a proposal from 1989 to 1990 (Lopez, M.L. 2013).

The Local Government Code, commonly known as the Local Autonomy Act or Republic Act No. 7160, was passed in 1991 and stipulated the creation of the Katipunan ng Kabataan (KK) and Sangguniang Kabataan (SK). The Kabataang Barangay (KB) was formally disbanded by this decree, and the KK and SK were established. All Filipino residents between the ages of 10 and 18 who have lived in a specific barangay for at least six months and who are listed on the official barangay list are included in the KK. The SK is made up of youth leaders chosen by the KK members to act as the organization's governing body. They serve the barangay by representing the youth and offering youth-focused services. It's important to note, though, that under Republic Act No. 9164, the age requirement for joining the KK and SK was eventually lowered to 15 and up. In 2002, the Local Autonomy Act underwent this modification.

2.3.2 Sangguniang Kabataan as Role Models

Youth have specific expectations of the Sangguniang Kabataan (SK) and their role in youth development, according to the 2004 National Youth Commission (NYC) study on Youth Attributes, Participation, and Service Providers (YAPS). The youth expressed a desire for the SK to arrange sports and youth events and act as role models based on the study. Government representatives, on the other hand, listed three crucial SK tasks, including creating and starting youth programs, acting as role models, and passing laws to support youth development.

The survey also showed that different age groups have distinct interests. Youth between

the ages of 15 and 24 demonstrated comparable levels of interest in schooling, employment, and sports and recreation. However, people in the 25–30 age group showed a greater interest in academic pursuits, employment, and skill development. Studies were the main priority for the 15–17 age group, while family was the top priority for the 18–24 and 25–30 age groups. The 25–30 age group also ranked finding a good job as their secondary goal.

Three key topics comprise the worries of the youth. First and foremost, drug usage, substance addiction, and sexual risk behaviors have a substantial negative impact on people's health. Second, access to inexpensive education, post-secondary education, and newer kinds of information and communication technology were all significant issues. The last big concern was employment, with job availability being the main worry among people between the ages of 18 and 24.

2.3.3 Local Youth Development Council

The following provisions are specified in the Sangguniang Kabataan Reform Act of 2015 as stated in the Implementing Rules and Regulations (IRR) of Republic Act No. 10742:

1. Youth Development Office: Every province, city, and municipality should have a Youth Development Office. This office should be headed by a youth development officer with the rank of at least a division chief. The placement of the office can be under the Office of the Local Chief Executive (LCE), Office of Planning and Development, Office of Social Welfare, or any other appropriate office determined by the local government unit. If the funds are sufficient, the Youth Development Office can be a separate department with divisions and units for policy and planning, administration and finance, and programs and operations. In cases where the local government unit exceeds the prescribed personal services limitations, the LCE may designate existing personnel to fulfill the role until the office is officially created. The LCE is responsible for establishing this office or designating the person within seven months from the approval of the SK

Reform Act.

2. Youth Development Council: To ensure broad and multi-sectoral youth participation in local governance, there should be a Provincial Youth Development Council (PYDC), City Youth Development Council (CYDC), and Municipal Youth Development Council (MYDC) in every province, city, and municipality, respectively. The PYDC, CYDC, and MYDC are headed by the respective SK Pederasyon President and composed of representatives from youth and youth-serving organizations at the provincial, city, and municipal levels. These councils assist in planning and executing projects and programs of the SK and the Pederasyons across all levels.
3. Youth Organization and Youth Serving Organization: A Youth Organization is an organization entirely composed of youth members whose ages range from fifteen (15) to thirty (30) years old. These organizations have a core advocacy that serves the youth. On the other hand, a Youth Serving Organization shares the same core advocacy but may have members who are not entirely composed of youth, including civil society organizations such as people's organizations and non-government organizations.

These provisions aim to promote youth development, enhance youth participation in local governance, and establish structures and mechanisms to support youth initiatives and programs.

2.3.4 Impact of Youth Center on the Youth

A Youth Center is a specially created area that focuses on the character development of young people in a community, in accordance with the guiding ideals of the National Comprehensive and Coordinated Program on Youth Development. The program seeks to empower young people to realize their potential for enhancing quality of life while promoting and safeguarding their entire well-being. It places a strong emphasis on instilling values such as nationalism, patriotism, faith, respect for human life, family harmony, and commitment to justice

and the truth.

The Youth Center primarily caters to kids between the ages of 11 and 18, while younger kids may also visit the facility if there are special programs designed to suit their needs. A variety of social and recreational activities are available at the Youth Center to help young people develop physically, socially, emotionally, and cognitively. It gives young people the chance to experience success, leadership, fun, friendship, and recognition (Mion, E.G., 2017).

Typically, the center provides structured educational programs in a variety of subjects, including physical activities like dancing, yoga, and martial arts, as well as cognitive and artistic programs like science, crafts, and drama. Additionally, it offers a place for unstructured activities like playing games, mingling, holding club meetings, and playing outside. Youth Centers are staffed locations where control and supervision are essential components, despite the fact that these unstructured activities are important for youth engagement. The facility's layout should take into account emulating a homey setting, fostering individuality and creativity, giving staff members enough space, and ensuring safety and health.

Accreditation agencies such as the National AfterSchool Association (NAA) and the National Association for the Education of Young Children (NAEYC) have established requirements for program quality and facility conditions. Additionally, the National Institute on Out-of-School Time (NIOST) offers training and curriculum development support for Youth Centers.

Overall, a Youth Center serves as a dedicated space where young individuals can engage in various activities, develop their skills and abilities, foster positive values, and contribute to their personal growth and the betterment of their community.

The National AfterSchool Association (NAA), formerly the National School-Age Care Alliance, and the National Association for the Education of Young Children (NAEYC) are two nationally renowned accreditation organizations that play a significant role in establishing standards and identifying requirements for programs and facility conditions in Youth Centers.

These organizations make sure that Youth Centers adhere to a set of high criteria for program quality, employee training, security measures, and general building layout.

Additionally, the National Institute on Out-of-School Time (NIOST) provides valuable support to Youth Centers by offering training opportunities and curriculum development resources. This helps in enhancing the quality of programs and ensuring that youth receive meaningful and enriching experiences at the centers.

As stated by Mion, E.G., in their work, important design objectives and factors for youth centers include creating a homelike environment, encouraging youth creativity and autonomy, providing staff members with adequate space to carry out their duties effectively, and maintaining a safe and healthy environment for all participants. These design goals contribute to a positive and conducive atmosphere within the Youth Center, fostering the holistic development of young individuals and promoting their overall well-being.

2.3.5 Library

Most people agree that libraries are important places to learn and important sources of information, especially for readers and researchers. In order to stay up with today's fast-paced environment, which is constantly changing by advancing technology, libraries must maintain their reading materials current. As a result, libraries need to build new facilities and acquire the newest collections to keep up with the demands of readers and scholars. However, it is clear that there are needs that must be met after looking at the condition of libraries in the Philippines. The bulk of the National Library of the Philippines' affiliated libraries experience problems like incomplete accession records, restricted access to contemporary book holdings, and inadequate facilities. These issues make it more difficult for libraries to successfully meet the demands of readers and researchers and to give students and scholars access to the most recent sources of information.

Libraries serve as platforms that grant individuals access to resources, whether physically or digitally, and can exist in physical or virtual forms, or even both. Books, journals,

newspapers, manuscripts, videos, maps, prints, documents, microforms, CDs, DVDs, Blu-ray Discs, e-books, audiobooks, databases, board games, video games, and more can all be found in a library's collection. The size of libraries varies greatly, ranging from smaller collections to those housing millions of items.

Libraries usually offer study areas that are quiet and social areas that promote group work and collaboration. Through public facilities, they frequently offer free access to electronic resources and the internet. Public and institutional collections and services are made available to anyone who either does not want to or can not afford to amass a sizable collection of their own. Libraries become crucial resources when looking for information that is not readily available to individuals alone or when seeking professional aid with their research.

More than 1,455 public libraries in the Philippines are supported by the National Library of the Philippines (NLP) through staff development, training, and partial book allocations. Congressional, city, municipal, and barangay-level local governments are required to establish public libraries and reading centers in their respective jurisdictions in accordance with Republic Act (RA) 7743, also known as "An Act Providing for the Establishment of Congressional, City, and Municipal Libraries and Barangay Reading Centers Throughout the Philippines," as well as related local regulations. However, the current total of 1,455 libraries is still a small number when you consider that there are still around 40,000 public libraries that need to be established and affiliated with the NLP.

Public library services play a key role in many communities in terms of supporting youth development, neighborhood health, agriculture, and general social and economic well-being. The concise statement in the IFLA UNESCO Public Manifesto that reads, "The public library, serving as the local gateway to knowledge, plays a fundamental role in fostering lifelong learning, empowering individuals to make independent decisions, and promoting cultural development for both individuals and social groups" captures the essence of this idea (Elbert and Atuti, 2011).

2.3.6 Space for rent

Public space refers to areas available for use by the community, such as parks, but it extends beyond that definition. Public space can also exist within enclosed environments that are typically paid for and used for leisure purposes, such as cafes, retail shops, or minimarkets.

In recent years, the significance of public space for the community seems to have been overlooked, leading to a lack of opportunities for people to connect with one another. Public space serves as a platform for interaction and communication within the community. According to Rissalwan Habdy Lubi, a social observer from the University of Indonesia, the absence of public space or limited opportunities for interaction can result in increased stress and a lack of productive activities. Public space, whether directly or indirectly, plays an essential role in shaping the surrounding area's quality of life.

Moreover, having a building that combines the Sangguniang Kabataan (SK) office, the Local Youth Development Council (LYDC), and public space is believed to benefit both users and developers of the building. The public space within the building can serve as a valuable source of income for its developers. The term "public space investments" refers to the allocation of public funds by various levels of government (local, regional, national, supranational) into the space industry, encompassing both commercial and non-commercial organizations engaged in space-related activities, including research and development.

Elizabeth Shreeve emphasized in 2019 that active open spaces provide a remarkable return on investment, often yielding greater benefits than the costs associated with their construction. These benefits extend to private development while simultaneously strengthening communities and creating opportunities for all.

2.3.7 Advantages and Disadvantages of SK

Despite varying public opinions about the Sangguniang Kabataan (SK), there are

both advantages and disadvantages associated with its implementation, leading to certain challenges within this organization.

Despite the SK's flaws, there are success stories that show off its potential to be a significant organization. The SK has created a new generation of local government leaders, including national legislators, similar to the Kabataang Barangay (KB). Linggo ng Kabataan (young Week), a weeklong celebration where young members serve as officials in local and national agencies, has been routinely observed by SK Federations at all levels. The SK has the ability to serve as a platform for youth participation, as shown by these specific examples:

- The KK and other youth organizations are often consulted and involved in project development by some SK officials at the barangay and municipal levels.
- In order to develop projects that extended beyond the normal summer sportsfest, such as setting up basketball competitions in barangays, a former SK chairperson trained their successor.
- Another SK representative organized a forestry effort in their region with the help of other SK members and pertinent organizations.

Research of studies, youth are most concerned about corruption at the municipal and barangay levels. They find it troubling when politicians use vote-buying, narco-politics, and nepotism to rig elections. Participants have expressed dissatisfaction that local government officials are being used as pawns in a political game. They are dissatisfied with the lack of comprehensive youth programming and the lack of support for current youth initiatives, including finance and implementation, which limits their projects to sporting events and street cleaning campaigns. The lack of authority and autonomy within the SK at the barangay level, where SK leaders are reduced to mere "consultative bodies" without genuine capacity to carry out their intended youth activities, was publicly expressed by attendees during Regional Youth Summits. They contend that political meddling limits the SK's potential. Additionally, SK officials are frequently thought of as being inept, ineffective, and lacking initiative. These worries are a

reflection of the youth sector's cynicism, indifference, and apathy toward the government and its youth-oriented policies. These issues are highlighted by youth underrepresentation in the SK and government-related programs, as well as the widespread perception that the government only looks out for itself (Belanon, F. et al., 2007).

2.4 Related Studies

Construction of Youth Center at M.H. Del Pilar, Jaro. USWAG ON THE GO (WELFARE): YOUTH CENTER, M.H. DEL PILAR, JARO is a Youth Center based in Iloilo City. This is one of the projects of the Uswag Ilonggo Regional Party-List that provides a safe space for the youth and the community. The project was bidded last March 19, 2021 with a contract price of 5,000,000.00 Php.

Figure 7

Uswag On The Go was posted by Mayor Jerry Treñason's Facebook Page

Sangguniang Kabataan Building. This 2.2 Million two-storey building is located at Barangay Balabag, Pavia, Iloilo 2.2 This serves as the Office of the Sangguniang Kabataan of the said barangay and a Satellite Teen Center wherein Alternative Learning Students (ALS) conduct their classes.

Figure 8

Sangguniang Kabataan Hall and Satellite Teen Center of Brgy. Balabag, Pavia, Iloilo

The Laufer Family Youth Resource and Community Center in Daraga, Albay. The youth resource and community center in the municipality of Daraga in Albay is a design where in a 2-storey building there are libraries, dental clinics, recreational space for children, a computer center, and offices for meetings and other activities involving the youth's active participation. The project was inaugurated on the 22nd of February 2018 and was built for the purpose of providing education, health, and nurturing the growth and potential of the teens with training and teaching them leadership and job skills all in one building.

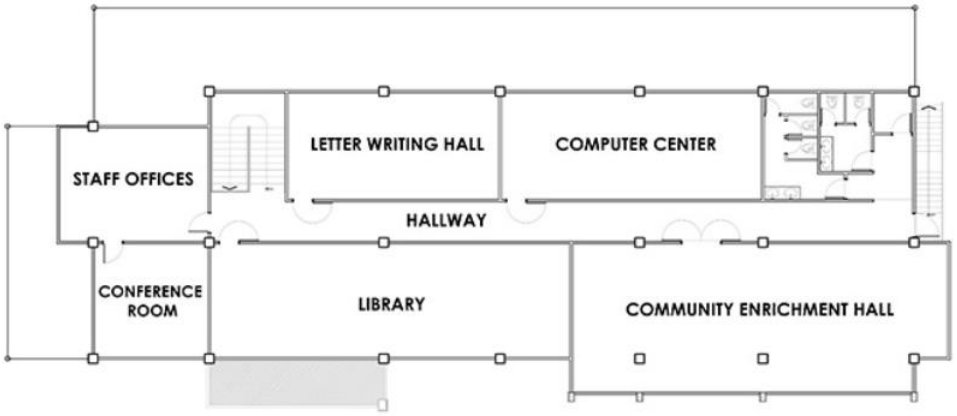


Figure 9

Ground floor plan of the youth resource center in Daraga, Albay

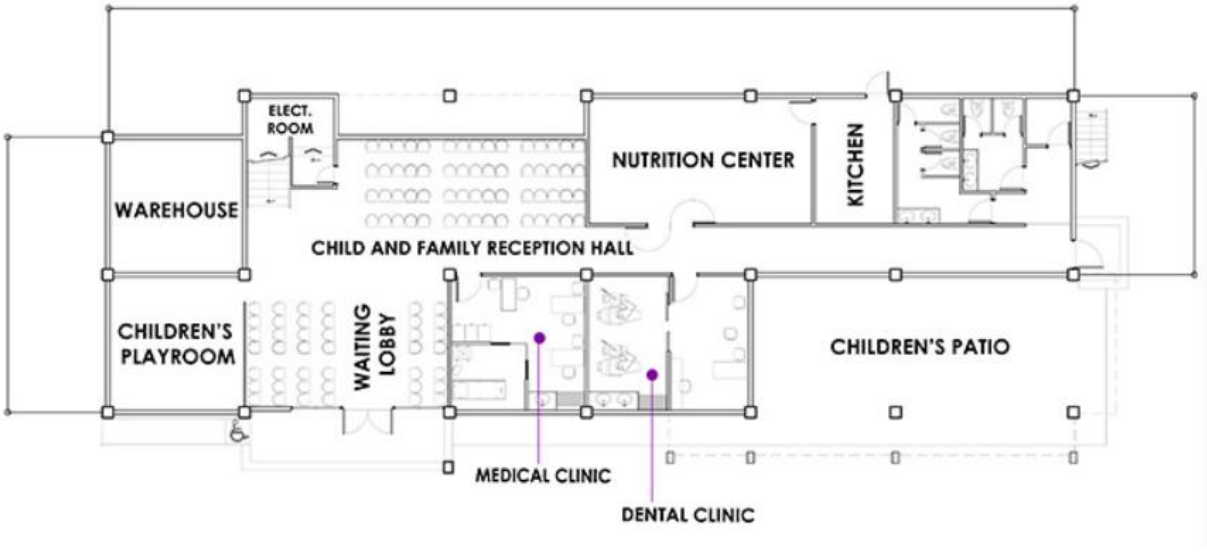


Figure 10

Second (2nd) floor plan of the youth resource center in Daraga, Albay, Philippines

Figure 11

Ground floor plan of youth resource center in Daraga, Albay, Philippines

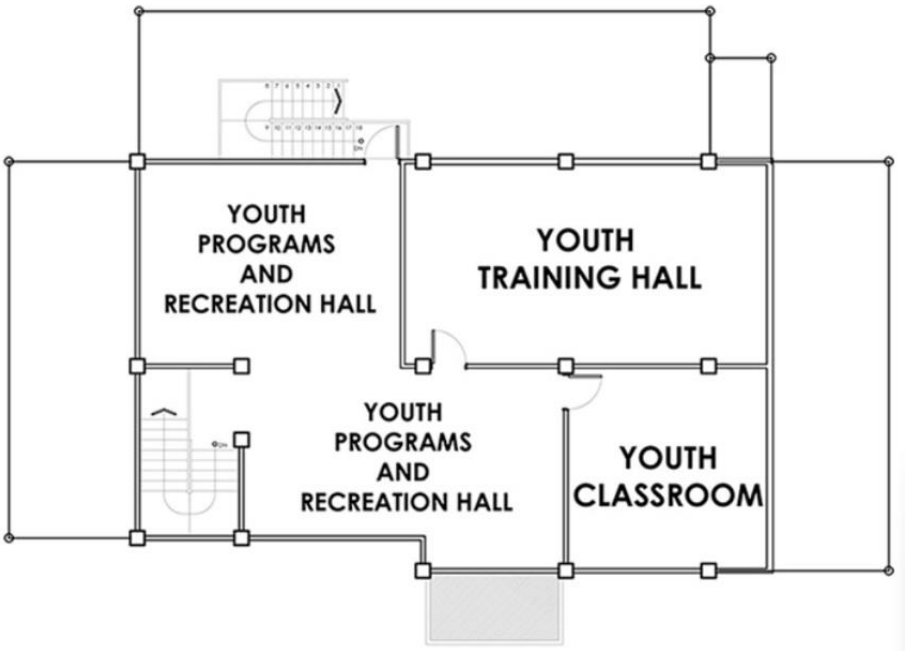


Figure 12

Second (2nd) floor plan of the youth resource center in Daraga, Albay, Philippines

A Proposed Construction of Two (2) Storey Multi Purpose Hall/SK Hall in Barangay UP Village, Quezon City. The project's recommended bid is up to 5,500,521.99 Php under the Resolution No. B013; S-2020. The Sangguniang Kabataan Hall will be used by the SK committee for planning, meeting for their projects and programs for their barangay in Quezon City. Taking in consideration that there are no existing SK offices or buildings in the area, this allows the local youth to be able to participate in their community.

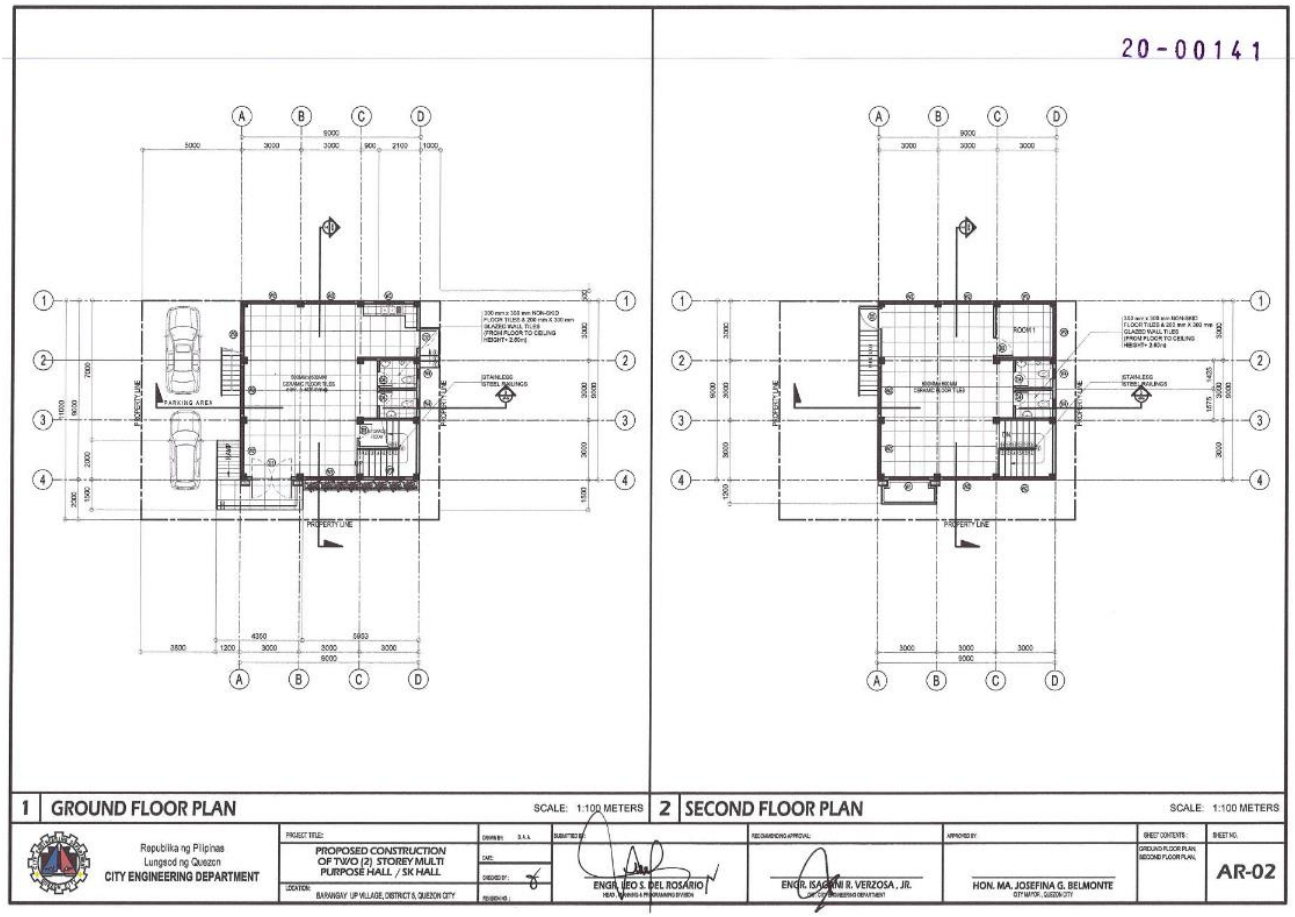


Figure 13

Proposed ground floor and second floor plan for the construction of a two-storey municipal hall/SK hall in Brgy. UP Village, Quezon City

2.5 Synthesis

Young people themselves as well as organizations and their activities can profit much from youth engagement. Collaborating with youth in program development increases the chances of effectively engaging the population and creating a greater impact. When young people are involved in decision-making processes that affect them, it increases the likelihood of their acceptance, adoption, and integration into their daily lives.

The Sangguniang Kabataan (SK) aims to promote youth involvement in various aspects such as social, political, economic, and cultural matters, which raises their awareness of current societal issues. The SK committee formulates and plans programs that benefit the youth's overall well-being. The Local Youth Development Center, composed of different youth organizations, assists in implementing these programs that prioritize the development of local youth.

Through the Local Youth Development Center, young people have the opportunity to participate in activities that promote character development and provide socialization opportunities for their growth. Educational centers also play a role in broadening the youth's perspective and raising awareness of important issues, helping them develop a sense of responsibility for their choices and well-being. Public libraries and teen centers serve as valuable sources of information for intellectual and emotional development among young people.

A youth center has two functions: it promotes unstructured social interaction between various age groups and offers educational sessions in a secure setting. Effective youth programs often revolve around public safe spaces, where young people can exchange ideas, acquire new skills, and make constructive use of their free time outside of school or work. Having a secure space allows young individuals to connect with others who may share similar experiences and challenges.

In today's fast-paced technological environment, there is an increased demand among

youth for accessible sources of knowledge, whether through public libraries or hands-on experiences provided in youth center programs.

It is crucial for the building to generate profit to cover utility expenses, maintenance costs, and security of the facility. Renting space in the building should consider the primary purpose of the building, reducing conflicts with its office functions.

The design of the proposed building benefits not only the local youth, SK, and LYDC committees but also the government funding the project.

Chapter III

Methodology

This chapter contains the design constraints and the contemporary issues involved in the project study. Furthermore, the chapter explains the methodology to be used for the data collection, design, and data analysis, construction scheduling, project cost estimation, and the resources and facilities to be utilized.

3.1 Design Constraints

3.1.1 Technical Constraints

Technical constraints are the limitations existing in the construction project including construction materials, equipment, and tools, and the design of the overall project. These constraints serve as a basis to ensure that the project is constructed in accordance with the budget, aesthetic, the wants of the client, to serve the purpose of the design for the construction project, and to abide with the codes and standards of the industry. The technical constraints refers to the windows, roofing, floors, and walls.

3.1.1.1 Choice of Windows

The proposed project is located along the roadway to the plaza and government center. This building will be a venue to conduct private meetings and do administrative works for the youth and youth leaders in Lambunao. Unnecessary noises from traffic and passerby will affect the design of the project. The study also proposes a public library as part of the youth center which explains that such noises will be a problem to the design. The design of the windows should be non-opening to reduce external noise with sound-attenuating laminated panes.

3.1.1.2 Alternatives for Walls

Modern, distinctive, and innovative ways to bring nature into rooms is the installation of green walls or eco-walls. As a natural acoustic filter, living green walls reduce noise levels in crowded areas while also improving air quality and lowering energy costs. In addition to being a supplier of good health, it also has aesthetic vibes that attracts the youths of Lambunao.

Plain painted walls and green walls were compared in terms of these criterias: appearance, energy efficiency, sustainability, sound insulation, cost, and maintenance as shown in Table 11. The alternative chosen was the green walls. Green walls are a great way to reduce noise and air pollution that is emitted outside the proposed project's location, even if they require a lot of maintenance. They also enhance air quality, offer thermal comfort, and absorb noise. Most importantly, it radiates positive energy that draws young Lambunaonons.

3.1.1.3 Material Selection of Roofs

Selection of materials for the roofing of the proposed structure was also considered. A roof acts as a layer of defense against weather factors. Selecting the right type of roof increases energy efficiency by reflecting heat rather than absorbing it and enhances a building's aesthetic appearance. Metal roof and polycarbonate roof are the two choices for the selection. As shown in Table 12, the two are contrasted based on the following criteria: appearance, benefits, typhoon resistance, heat resistivity, cost, and maintenance. The polycarbonate glass roofs provide daylight to the ground floor, whereas metal roofs are preferred for their cost-effectiveness.

3.1.2 Green Building Technology

Green building technology utilizes advanced technologies to develop buildings

with minimal impact on the environment. The design includes utilizing accustomed lighting fixtures, use of windows for natural light and natural air flowing inside the building. The use of big windows gives ventilation and proper lighting which could reduce the use of air conditioning in other offices of the building which also contributes to the reduction of electric energy consumption as depicted in Table 7 and Table 13.

Table 7

Advantages and disadvantages of Green Building Technology.

Advantages	Disadvantages
Cost-effective	High initial investment
Improve health	Lack of availability of green materials
Increased efficiency	Longer time to build
Better environment	Uncontrollable air temperature
Water conservation	Limited professional workers
Psychologically-optimized Environment	Technology relatively new and immature

3.2 Contemporary Issues

3.2.1 Social and Mental Health Issues. The youth need proper guidance with the right people to influence them and correct their behavior towards themselves and to others. Youth development is a process that the teens adapt and learn as they grow. The decisions that the youth make and the way they think are influenced by such factors such as the media, their social groups, and their environment. Teenage pregnancies happen due to the lack of proper education when it comes to sexual intercourses. The teens need to be properly educated through seminars and programs that raise their awareness of themselves to think before they act or make any decisions. Programs provided by the youth center will go through a process where the youth will be able to learn how to be responsible teens.

3.2.2 No Meeting Spaces. Official meetings and gatherings require a space with no distraction and unlimited time of use. There is no facility for SK officials which delays the administrative works. It is necessary for the officials to do their voluntary work for the community of Lambunao with no limited time and zero cost. The current SK officials rent a space at the cost of their own personal expenses due to the unavailability of the municipal hall which is being used by other government officials. Providing offices for SK officials can help plan and organize their programs and activities whenever possible.

3.3 DESIGN FRAMEWORK

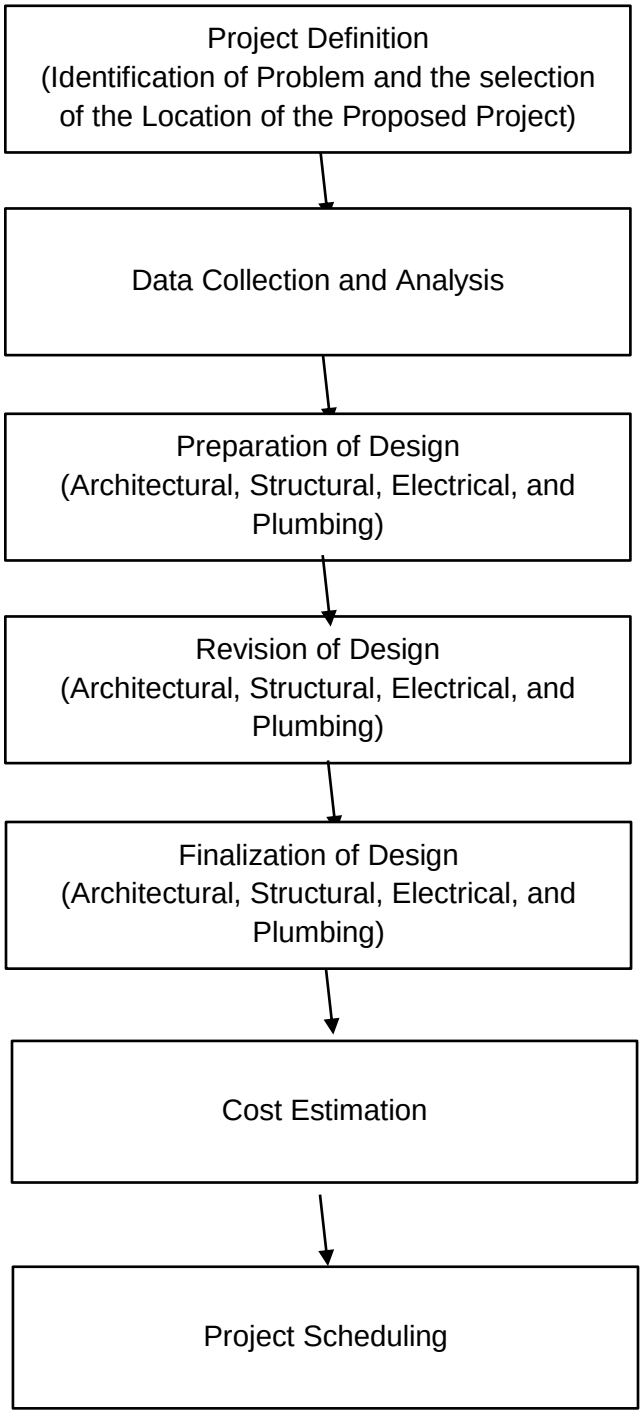


Figure 14

Design Framework of the Two-Storey Sangguniang Kabataan Building with Local Youth Development Center Office in Lambunao, Iloilo

3.4 Project Definition

3.4.1 Problem Identification and Location Selection of the Proposed Project.

A request for a list of the municipality's priority projects and the researchers have seen that among the lists that the municipality has provided, there are no offices for the youth leaders, nor teen centers for the youth in the community, and no existing public library. Thus, a two-storey SK building with LYDC office in Lambunao, Iloilo was proposed. The proposed project is located at the available space near the New Government Center with a lot area of approximately 732 sq. meters. The proposed project was divided into different offices/facilities such as SK and LYDC office, conference hall, teen center, and public library. Additionally, the municipality of Lambunao provided local information necessary for the proposed project.

The selection of the location of the proposed project was based on the appropriateness of the location in terms of space and soil topography and availability of the land area as suggested by the Municipal Engineering Office (MEO). Furthermore, the design of the proposed structure was established in consideration to the beneficiaries' preferences.

3.5 Data Collection and Analysis

3.5.1 Site Visit. Investigation was conducted at the location of the site for the proposed project to be constructed. The site for the proposed Design of a Two-Storey Sangguniang Kabataan Building with Local Youth Development Council Office in Lambunao, Iloilo was visually inspected by the researchers.

Necessary documents and needed information was requested by the researchers from the Municipal Engineering Office such as maps, and the size and scope of the land area of the proposed site.

The information gathered during site visit and investigation was analyzed and used to

help in the preparation of designs.

3.5.2 Survey of the Land. A copy of the site location of the proposed project as requested from the Municipal Engineering Office of Lambunao shown in figure 15 and figure 16.

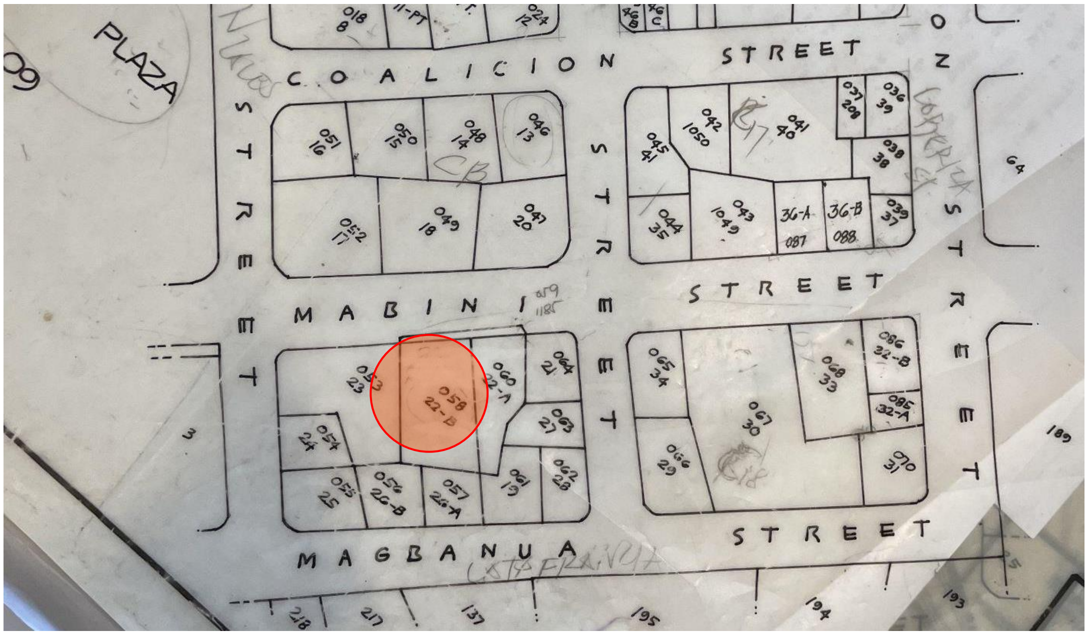


Figure 15

Boundary Survey Location of the Proposed Site-Lot 22B

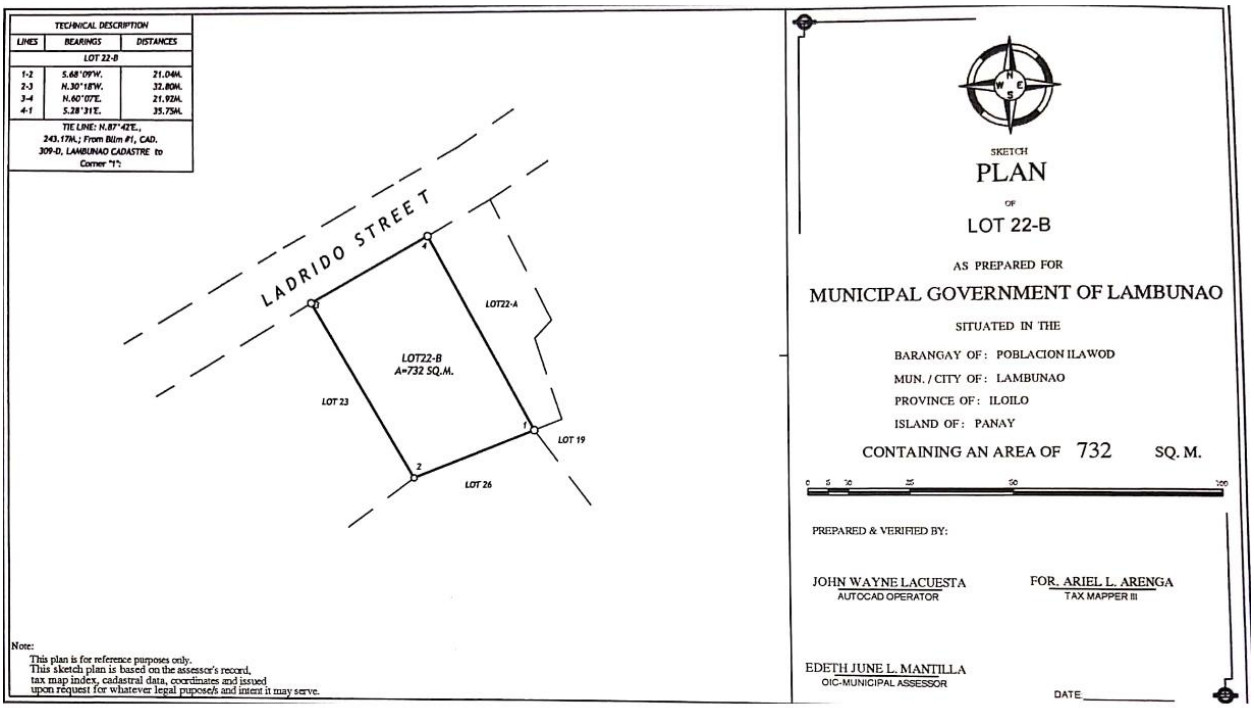


Figure 16

Lot Plan of the Proposed Site-Lot 22B

3.5.3 Geotechnical Investigation. Geotechnical investigation was conducted to observe and analyze the soil profile and its properties. The researchers identified and obtained soil samples that were tested accordingly with the minimum testing requirements for the proposed project.

As the results are out from the investigation, the researchers identified the capacities of the soil and its soil classification to determine if the soil passed the minimum requirement for the foundation of the proposed two-storey SK and LYDC office.

3.6 Preparation of Design

3.6.1 Architectural Design. The architectural plan was based on the determined factors of a youth center, its standard designs from the DILG. The architectural design was made with the help of an architect in accordance with the standards in making floor plans and for the

aesthetics of the proposed building which also is a scope of an architect. Furthermore, the design of this proposed project maximized the efficiency and function of the structure which will incorporate features with sustainable developments.

3.6.2 Structural Design. The evaluation of the structural plans and features was carried out in accordance with the guidelines outlined in the National Building Code of the Philippines (NBCP) 2005. Similarly, the design of slabs, beams, columns, footings, and other structural elements considered the appropriate loads, occupancy, and necessary provisions, as stipulated in the National Structural Code of the Philippines (NSCP) 2015, as well as other relevant codes and legal requirements. Additionally, a seismic analysis was conducted to ensure the building's structural integrity and to incorporate additional precautions for earthquake loads.

3.6.3 Plumbing and Electrical Design. The plumbing and electrical plan designs were based on the standards and specifications from the National Building Code of the Philippines (NBCP) 2005, National Plumbing Code of the Philippines (NPCP) 1999, and other codes in accordance with the law. In addition to that, a consultation was conducted with the experts in this field, which would be Master Plumbers and Professional Electrical Engineers, for the proper schematics and design layouts of the plumbing and electrical systems of the building that is to be expected in the building phase. These plans were subjected for consultation with the clients and other stakeholders involved in the budget committee to check if the plans satisfied the needs of the client.

3.7 Revision of Design

During the study, the plans underwent revisions based on the technical feedback provided by the Civil Engineering Faculty, Adviser, and other professionals including Architects, Master Plumbers, and Professional Electrical Engineers.

3.8 Finalization of Design

To accommodate more effective methods and to maximize the efficiency of the plans, the finalization of the design was made after the revisions and other changes were incorporated into the study.

3.9 Project Scheduling

Project work scheduling tracks and projects the duration of the implementation and construction of the proposed structure. In this study, the Program Evaluator and Review Technique and Critical Path Method (PERT-CPM) was utilized to track the project's activities and duration. Gantt charts were used to illustrate the progress and to easily track the projected activities. Furthermore, to avoid delays in the project, the PERT-CPM was employed in determining the critical path of the construction work schedule, and to ensure the target number of days for the construction of the project was accomplished to eliminate or lessen contingencies, and other expenses that the project might experience.

3.10 Cost Estimation

Project cost estimate constitutes the equipment, materials, labor, and the contingencies of the proposed project. The equipment and materials estimates were based on the current marketability, location, and prices of the raw materials that were needed. In lieu of this, the quantity and quality of the materials are secured to have met the standards and was qualified for the project cost estimations. In terms of labor cost, it was dependent on the current salary wage mandated by the law. The possible contingencies are subjectively set and agreed upon by the parties involved and those imposed by the laws. Eventually, the project cost estimation was carried out with the help of RICS new rules of measurement, volume 2, detailed measurement of building works, which provided the essential guidance in the making of quantitative measurement. The rules have been established to give a standard set of measurements that can be understood by anyone involved in the field of a construction project including the

employer and to help in the communication scheme between the project team and to help in the communication scheme between the project team and other concerned parties.

3.11 Resources and Facilities

Municipality of Lambunao, Iloilo. The required information such as the site location for the development and construction of the project, the vicinity map, lot plan, and the data and records the population of the youth which includes the suicide and pregnancy rates of the municipality, was provided by the municipality of Lambunao working with the Municipal Engineering Office and the office of the municipal police.

Codes and Provisions. National Structural Code of the Philippines. The structural design of the transport terminal and commercial building based upon the provisions set by the NSCP (2015)

Other Codes and Provisions. Regarding other codes that were used in making and designing of the building such as the Electrical Code of the Philippines and the National Plumbing Code of the Philippines served as bases for other necessary elements of the structures in accordance with the electrical plans and plumbing plans.

Engineering Programs and Softwares. The proposed analysis and design of the building was assisted with the engineering softwares such as SAP 2000, STAAD, ETABS, Drawing and Modelling programs. These softwares were utilized for the counter-checking of the different analysis and the overall design computations for the betterment of the building plan.

Project Design. The schedule and the cost estimate of the proposed project was based on the concepts and principles of the Construction Management.

Spreadsheet Software. The Microsoft Excel was used to work with necessary computations for the cost estimate of the project and structural analysis. The program was utilized to formulate the schedule of the project.

Sources of Information

Internet. References from published articles and similar projects online were used for the data collection required for the study.

Documents. Data and information from surveys and questionnaires, and personal investigation was considered as references for the study. Images of the site and the needed information for the study was documented to serve as evidence using phone cameras.

Books. Literature from local libraries and international books with authors and year that guided the researchers in brainstorming and planning the details of project study.

Existing Buildings. Existing buildings that are related to the study that served as reference or inspiration for the proposed design of the proposed project.

Existing Studies. Existing studies that are relevant to the study were considered as guidelines for the researchers, which is an important aspect in the study.

Chapter IV

Project Area

4.1 Background and General Features of Lambunao Iloilo

4.1.1 Historical Background

The town's prevailing wisdom holds that the name "Lambunao" has Spanish roots. According to legend, a party of Spanish explorers discovered the area now known as Barangay Daanbanwa in 1569 while traveling across the countryside. With the exception of one man who was fishing in the lake and was not aware of their presence, the native occupants fled when they saw the white men. With the aid of a Malay interpreter, a Spanish soldier approached him and inquired for the location's name. The native responded in his original tongue, "Nagapanglambo sa Linao," which means he was using a hook and line to fish in the lake, assuming he was being asked what he was doing. The Spaniard abbreviated it to "Lambunao" thinking that this was the name of the place, and that is how the town has been known ever since.

In the past, a tribe led by Tumangas moved westward and established a settlement in Balikatkaton, which is now Barangay Da-anbanwa. The Ulian River separated this settlement from the eastern side, later known as Dueñas, which was inhabited by a tribe led by Kaputi. The native inhabitants governed the area for many years, living in prosperity and contentment. However, in the year 1569, a group of Spaniards who had settled in Aklan made their way into the hinterlands to gather resources and explore new places. When they reached Balikatkaton, the natives fled upon seeing the white men, except for one man who was fishing in the lake. A Spanish soldier approached him and, with the help of a Malay interpreter, asked for the name of the place. The man, believing he was being asked about his activity of fishing with a line and hook, provided a long answer. However, the Spaniard, considering it the correct response,

shortened it to "LAMBUNAO" due to its length. From that time onward, the place became known as Lambunao.

4.1.2 Climate

The Municipality of Lambunao experiences two distinct climatic conditions. The first type is the most common, characterized by two prominent seasons: a wet season from May to October and a dry season for the remainder of the year. The presence of mountain ranges such as Cabatangan, Bagongbong, Jayubo, and Agsirab provides some protection against the northwest monsoon and a portion of the trade wind, but these regions are susceptible to the southwest monsoon. On the other hand, the Third Type condition exhibits less pronounced periods of heavy rainfall, with a relatively wet season from May to October and a dry season for the rest of the year as shown in Figure 17 and Figure 18.

Climate data for Lambunao, Iloilo [hide]													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average high °C (°F)	29 (84)	30 (86)	32 (90)	33 (91)	31 (88)	30 (86)	29 (84)	29 (84)	29 (84)	29 (84)	29 (84)	29 (84)	30 (86)
Average low °C (°F)	22 (72)	22 (72)	22 (72)	23 (73)	25 (77)	25 (77)	24 (75)	24 (75)	24 (75)	24 (75)	23 (73)	22 (72)	23 (74)
Average precipitation mm (inches)	48 (1.9)	41 (1.6)	58 (2.3)	82 (3.2)	223 (8.8)	300 (11.8)	346 (13.6)	307 (12.1)	311 (12.2)	292 (11.5)	167 (6.6)	81 (3.2)	2,256 (88.8)
Average rainy days	11.4	7.7	11.3	15.4	25.7	28.5	29.5	28.7	28.3	28.7	21.8	15.2	252.2
Source: Meteoblue[6]													

Figure 17

Climate Data of Lambunao, Iloilo

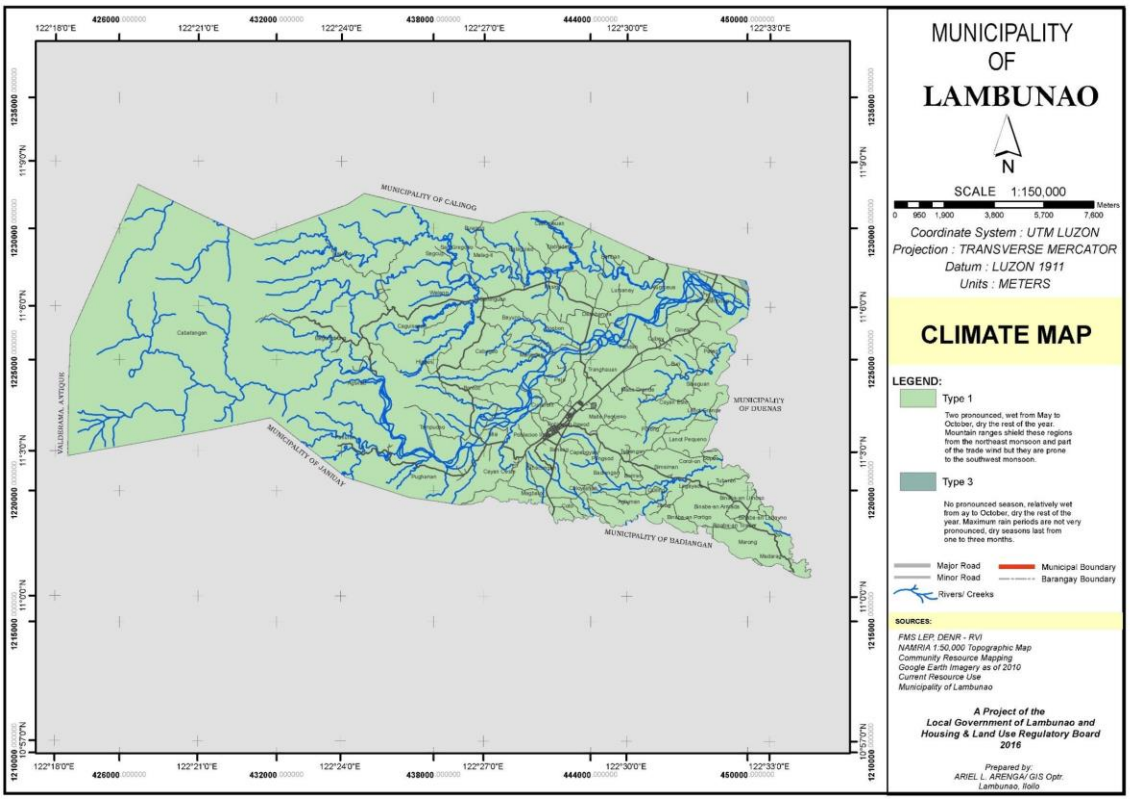


Figure 18

Climate Map of Lambunao, Iloilo

4.1.3 Land Area

Lambunao is a municipality that is encircled by land and is located in the coastal province of Iloilo. The second largest of the 43 municipalities in the province, it has a total land area of 407.09 square kilometers, or 157.18 square miles. The region is fortunate to have an abundance of resources, a comfortable climate, a rich cultural legacy, and a community that values peace and progress. 8.15% of the entire area of Iloilo is taken up by Lambunao. The municipality has 81,236 residents as of the 2020 Census, which was 1.02% of the total population of the Western Visayas

4.1.4 Topography, Slopes, and Elevations

From practically flat or slightly sloping regions to rolling hills, Lambunao's terrain displays a diversified scenery. The western portion of the municipality is traversed by the Ulian River, which also forms a crossing point for the Calinog border. The slopes of the flat plains within its 24,923.6187 hectares of land range from 0 to 3%, while those of the gently undulating hills and mountainous regions range from 3-8%, 8-18%, 18-30%, 30-50%, and higher. Streams and creeks crisscross the steep barangays of Lambunao, including Pughanan, Panuran, Cabatangan, Agsirab, Bagongbong, Jayubo, and others. The two existing rivers act as the main drainage channels for the area, and the hilly areas help to facilitate the flow of water from the mountains that enriches the plains. These different characteristics of the land are shown in Figure 19 to Figure 23.

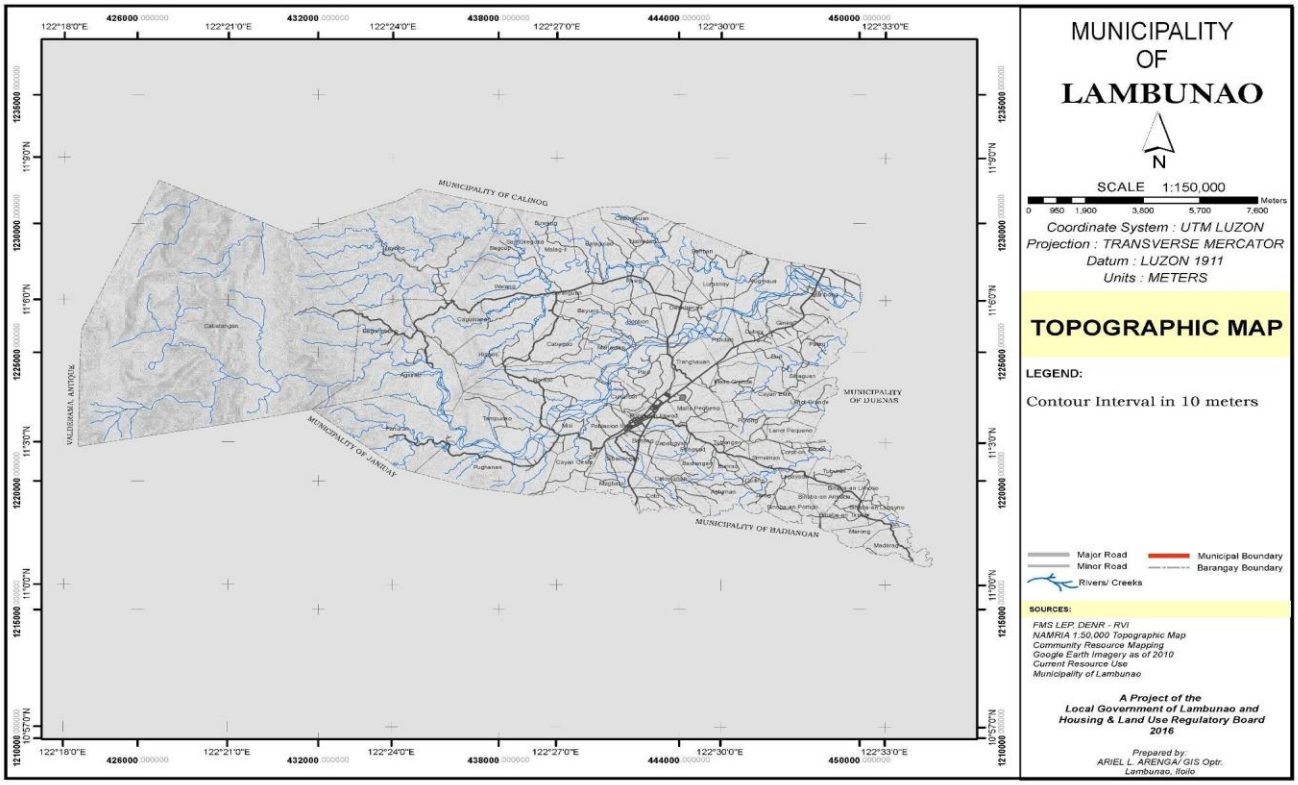


Figure 19

Topographic Map of Lambunao, Iloilo.

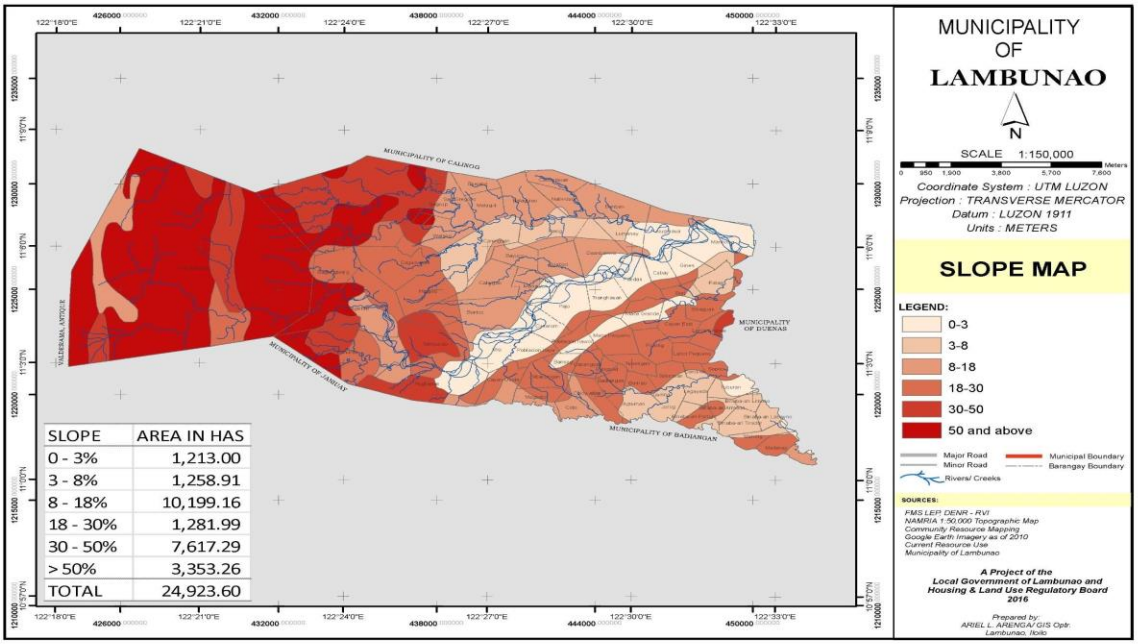


Figure 20

Slope Map of Lambunao, Iloilo.

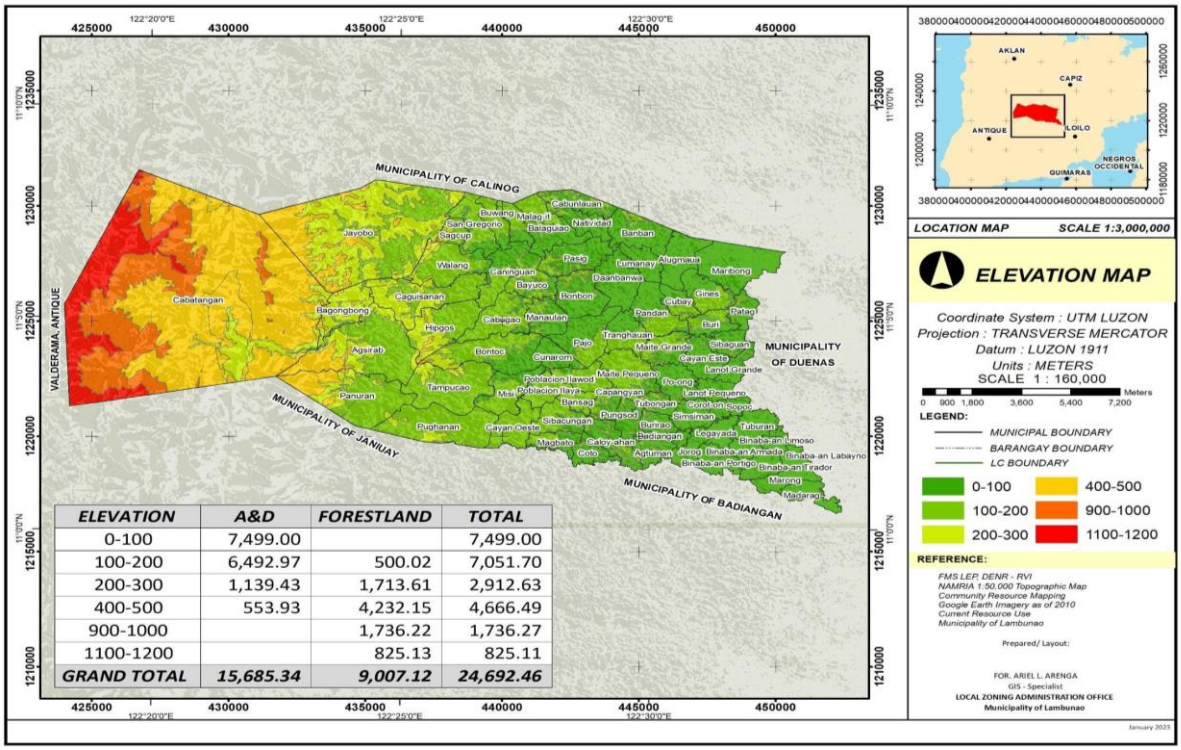


Figure 21

Elevation Map of Lambunao, Iloilo.

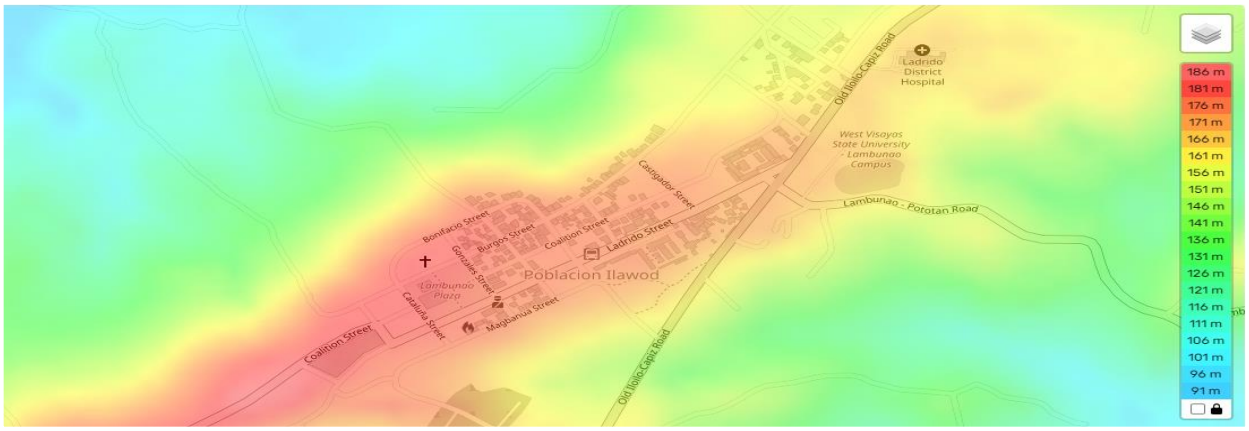


Figure 22

Topographic Map of Barangay Poblacion Ilawod and its nearby barangays

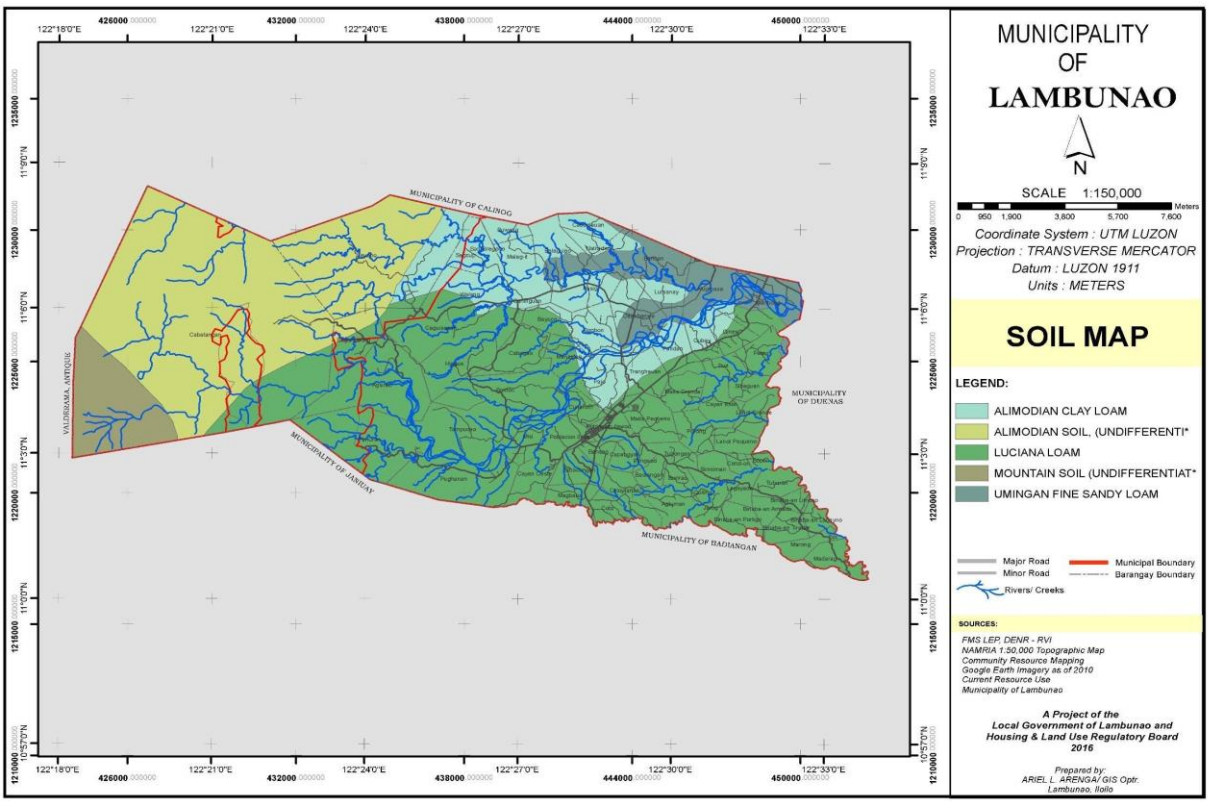


Figure 23

Soil Map of Lambunao, Iloilo

4.1.5 Location

Lambunao is located in Central Iloilo, approximately 48 kilometers away from the city. It is often referred to as the "Baguio of Iloilo Province." The municipal center of Lambunao can be found on the island of Panay, specifically at around 11° 3' North, 122° 28' East. The elevation at these coordinates is estimated to be 180.2 meters or 591.2 feet above mean sea level. The municipality is bordered by Calinog to the North, Pototan and Dueñas to the East, Badiangan and Janiuay to the South, and Antique and Janiuay to the West (Figure 25).

4.1.6 Demographics

The population of Lambunao has experienced significant growth over the years, increasing from 6,661 in 1903 to 81,236 in 2020.This shows an increase of 74,575 persons during a 117-year period. With an increase of 7,596 persons from the previous census in 2015, when there were 73,640 people, the most recent census in 2020 reveals a positive growth rate of 2.09%. According to the 2015 Census, the age group of children in Lambunao with the highest population consisted of 8,048 people. On the other hand, with only 1,045 people, the 75 to 79 age group has the lowest population. When all age groups are considered, individuals under the age of 14, which includes newborns, young children, and adolescents, make up 31.82% (or 23,431) of the population. The population that is economically active, or those between the ages of 15 and 64, makes up 61.09% of the total population (44,988). Last but not least, 5.221 people, or 7.09% of the population, are seniors. According to the calculated age dependency ratios, there are 52 young dependents and 12 elderly or senior individuals for every 100 people in the working age population. Overall, there are 64 dependents (young and old) for every 100 people in the working population. Given that Lambunao has a median age of 25, it is clear that half of the population is under 25, while the other half is 25 or over as shown in Table 8.

Table 8

Population of 10-30 years old at Poblacion Ilawod based on their educational attainment

Educational Attainment			
Sex	**Male**	**Female**	**Total**
No education	4	7	11
Primary 1-4	16	19	35
Intermediate 5-6	14	20	34
High School Level	123	126	249
High School Graduate	112	113	225
Vocational	2	5	7
College Level	115	117	232
College Graduate	107	108	215
Total	**493**	**515**	**1008**

4.2 Background and General Features of the Project Site

4.2.1 Location of the Project Site

The proposed Two-Storey Sangguniang Kabataan Building with Local Youth Development Council Office is planned to be located in Barangay Poblacion Ilawod (Figure 26), specifically chosen by the municipal government. One of the barangays in Lambunao, a municipality in the province of Iloilo, is Poblacion Ilawod. Poblacion Ilawod's population was

estimated at 2,976 people in the 2020 Census, which represents 3.66% of Lambunao's overall population.

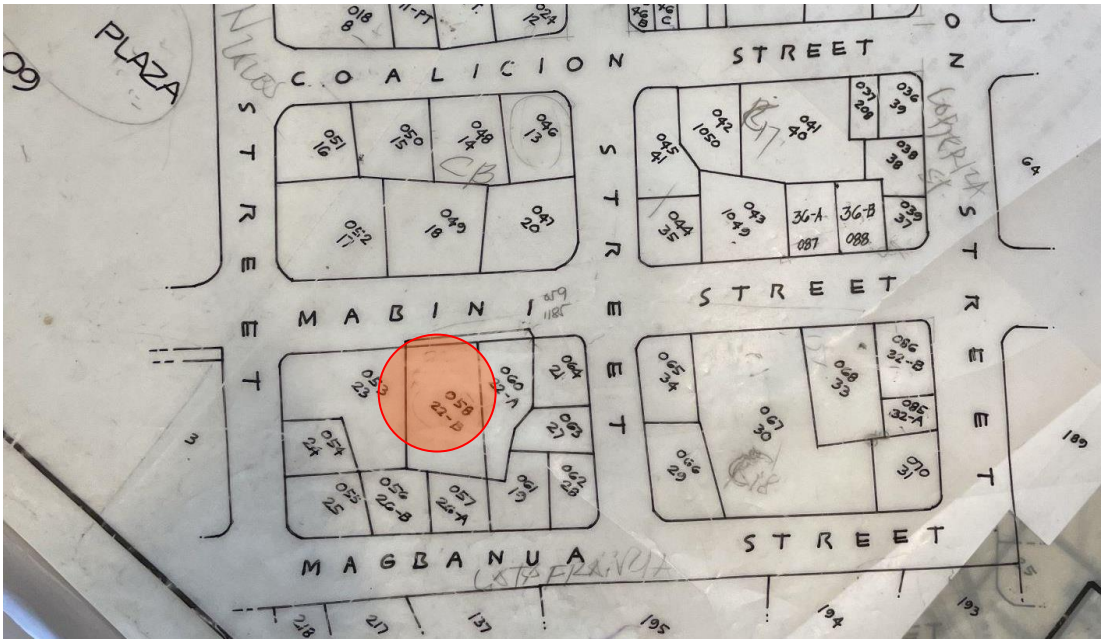


Figure 24

Boundary Survey Location of the Proposed Site-Lot 22B

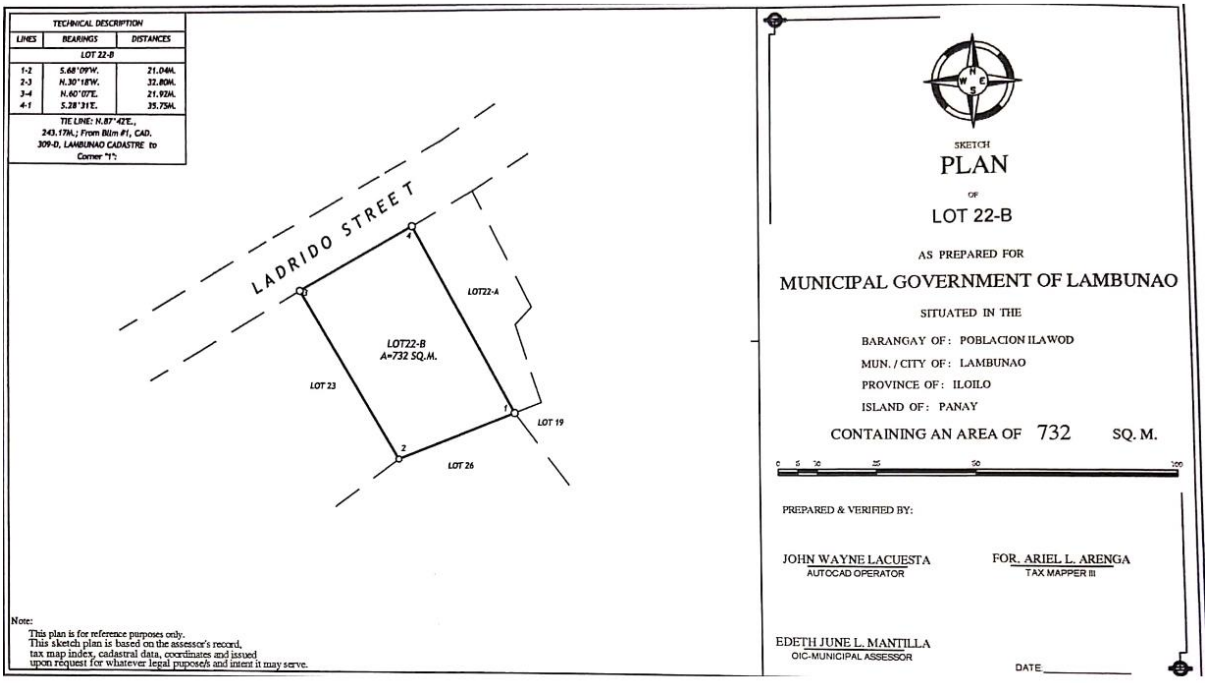


Figure 25

Lot Plan of the Proposed Site-Lot 22B

4.2.2 Geology

4.2.2.1 Soil Type and Land Terrain

In terms of soil composition, Lambunao consists of five distinct types: Alimodian clay loam, Alimodian soil, Luciana loam, Mountain soil, and Umingas fine sandy loam. These soils possess genetic and morphological characteristics that contribute to their fertility, making them suitable for cultivating a variety of crops. The prevalence of loam soil classification creates a favorable environment for agricultural activities in the municipality.

Table 9

Soil Categories in Lambunao

Soil Type	Area Occupied	% of Total Area
Alimodian clay loam	3,592.43	15%
Alimodian soil	6,545.15	26%
Luciana loam	12,203.69	49%
Mountain soil	1,120.62	4%
Umingas fine sandy loam	1,461.72	6%
Total	24,923.61	100%

The soil investigation conducted showed that the soil classification in the project site is a well-graded sand with silt. The barangay Poblacion Ilawod, where the site is situated belongs to Luciana Loam type of soil with an area of 12,203.69 has. Hence, the data that was collected makes the soil investigation accurate.

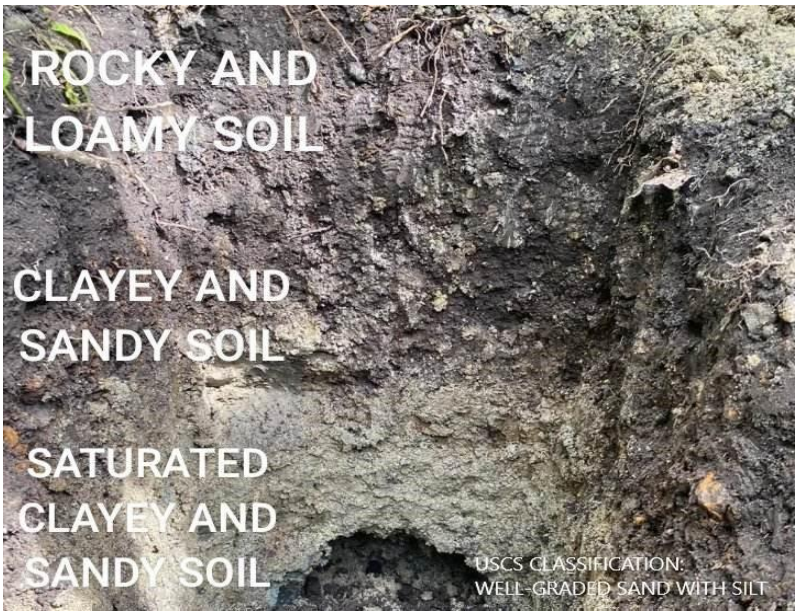


Figure 26

Actual Soil Profile of Bore Hole in Proposed Site

As shown in Figure 26, rocky and loamy soil, clayey and sandy soil, and saturated clayey and sandy soil was the actual soil profile in the proposed site that was observed after the soil investigation was conducted. Additionally, the site's soil is a well-graded sand with silt (SW-SP) that was categorized under the Unified Soil Classification System (USCS).

4.2.2.2 Mineral Resources

The municipality of Lambunao primarily has gravel and sand as its mineral resources. These resources are located in the river beds of Ulian River and Tacbakan River, which flow towards the town of Dueñas. The municipality utilizes these mineral resources for construction purposes, including various projects and infrastructure development within the seventy-three barangays of Lambunao. Gravel and sand are particularly essential for maintaining barangay roads and improving municipal infrastructure.

4.2.2.3 Nearest Fault in the Project Site

The nearest fault in Barangay Poblacion is the West Panay Fault with a distance of 12.6km. According to the Philippine Institute of Volcanology and Seismology (PHILVOLCS), within 10 meters wide of the fault should be a no-build zone. This is to avoid the hazard of the ground fissure as it can be dangerous for the foundation to withstand future ground deformations. As it is 12.6km away from the nearest fault as shown in Figure 27, the hazard assessment results from PHIVOLCS are considered safe.

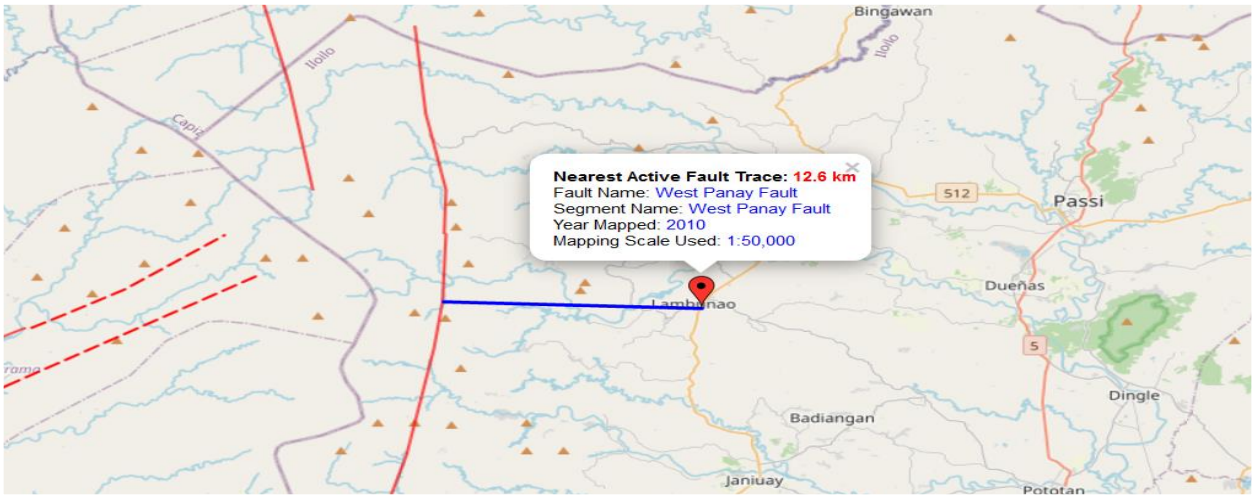


Figure 27

Nearest Fault in Lambunao, Iloilo

Chapter V

The Proposed Project

The purpose of the proposed project was to design a two-storey Sangguniang Kabataan Building with Local Youth Development Council Office in Lambunao, Iloilo. The proposed building is not only limited as a meeting place for Lambunao youth leaders but also served as a venue for enhancing the knowledge as well as heal the physical and mental health of the youths in Lambunao, Iloilo. Furthermore, the project also has rental spaces imparting opportunities to business owners that seek space and targets the youths as customers.

5.1 Design Considerations

5.1.1 Technical Constraints

Technical constraints are the limitations existing in the construction project including construction materials, equipment, and tools, and the design of the overall project. The constraints serve as a foundation for ensuring that the project is built in accordance with the budget, aesthetic, and client desires, to serve the goal of the design for the building project, and to comply with industry norms and standards. The technical constraints refers to the windows, roofing, floors, and walls.

5.1.1.1 Choice of Windows

The design of the windows should be non-opening to reduce external noise with sound-attenuating laminated panes, as depicted in Table 10. Sound-attenuating laminated panes were incorporated in the design due to the appearance, time of manufacture, strength, sound insulation, fire and termite resistance, and maintenance. Majority of the windows applied in the designs were sound-attenuating laminated panes.

Table 10

Comparison of consideration of constraints for windows

Options	Advantages	Disadvantages
Non-opening Window	Energy efficient Low maintenance Provide an expansive view Natural light	No circulation of fresh air. Energy gain in a warm climate Expensive Poor ventilation
Sound-attenuating Laminated Panes	Noise cutback Reduce the access of harmful UV rays from the sun by around 99%. Added air space also provides an insulated value. Easy to install Requiring no replacement of an existing window	Expensive

(Based on Advantages & Disadvantages of Window, 2021 and S., 2014)

Both materials are expensive yet the municipality focused on choosing the sound-attenuating laminated panes as windows to ensure that there are no external noise disturbances in the library, and the conference hall. Additionally, because it is a public space, people will come and go inside the building which may be considered as another agent for external noise. Therefore, sound-attenuating laminated planes are used.

5.1.1.2 Alternatives for Walls

Plain painted walls and green walls were compared in terms of these criterias: appearance, energy efficiency, sustainability, sound insulation, cost, and maintenance as shown in Table 11. The alternative chosen was the green walls. Green

walls enhance air quality, offer thermal comfort, and absorb noise. The green walls were applied to the front elevation of the building that radiates positive energy as shown in figure 29.

Table 11

Comparison of consideration of constraints for wall designs

Options	Advantages	Disadvantages
Plain Painted Walls	Improve appearance of the building Versatile Cost-effective Easy to clean Quick to apply	Limited texture Less durable High-maintenance Time-consuming and messy to prepare
Green Walls	Decreased stress and improved mental wellbeing Energy efficient Act as natural air purifiers Absorbs sound Cool the surrounding air Increase property value	Require maintenance Excessive watering pretty commonly leads to mold of walls and floors

(Based on Indigo Paints, n.d. and Clarkson-Bennett, 2021)

Green walls are in need of maintenance on a daily basis compared to the plain painted walls but the municipality prioritizes more on spreading awareness of green buildings which must be seen in the building. Aside from the aesthetic factor, the green walls absorb sound which is one of the main priorities of the building based on the facilities that the project has. So, rather than choosing easy painted walls, the municipality preferred the green walls for its benefits as seen on table 11.

Figure 28

Exterior Perspective of the Proposed Structure

5.1.1.3 Material Selection of Roofs

Selecting the right type of roof increases energy efficiency by reflecting heat rather than absorbing it and enhances a building's aesthetic appearance. Metal roof and polycarbonate roof are the two choices for the selection. The polycarbonate glass roofs provide daylight to the ground floor, whereas metal roofs are preferred for their cost-effectiveness. The two types of roof were applied in the design of the proposed structure.

Table 12

Comparison of consideration of constraints for roofs

Options	Advantages	Disadvantages
Metal Roof	Won't be blown away by the wind Adoptive in terms of roof design Eco-friendly Energy efficient Long-lasting Durable	Expensive installation Noisy when an object hits the roof Difficult accessibility
Polycarbonate Glass Roof	High-Quality Bullet Resistant Lightweight UV Resistant Perfect for Greenhouses Resistant to Extreme Temperatures Protects Against Discoloring	Susceptible to scratch and denting Expensive

(Based on (Pros & Cons of Metal Roofs | AllHome, 2021 and Polycarbonate Roofing Pros and Cons | a&C Plastics, n.d.)

Metal roofs are used for the non-glass roof design. Because of the design of the roof that is shaped like a wing, the metal roof was the best option to install. It was the preferred choice to ensure the durability of the design and helped make the shape long-lasting. However, the glass roofs, the municipality preferred to use polycarbonate glass despite its expensive cost, it is lightweight, protects from discoloration, and of course the most preferred advantage of the material is the resistance to extreme temperatures which is experienced here in the region.

As shown in Figure 29 and 30, the metal roof was the material chosen for the second floor that is designed as a wing of a local bird while a polycarbonate glass roof was installed as the roofing for some parts of the ground floor to provide natural

lighting in consideration of green building technology.

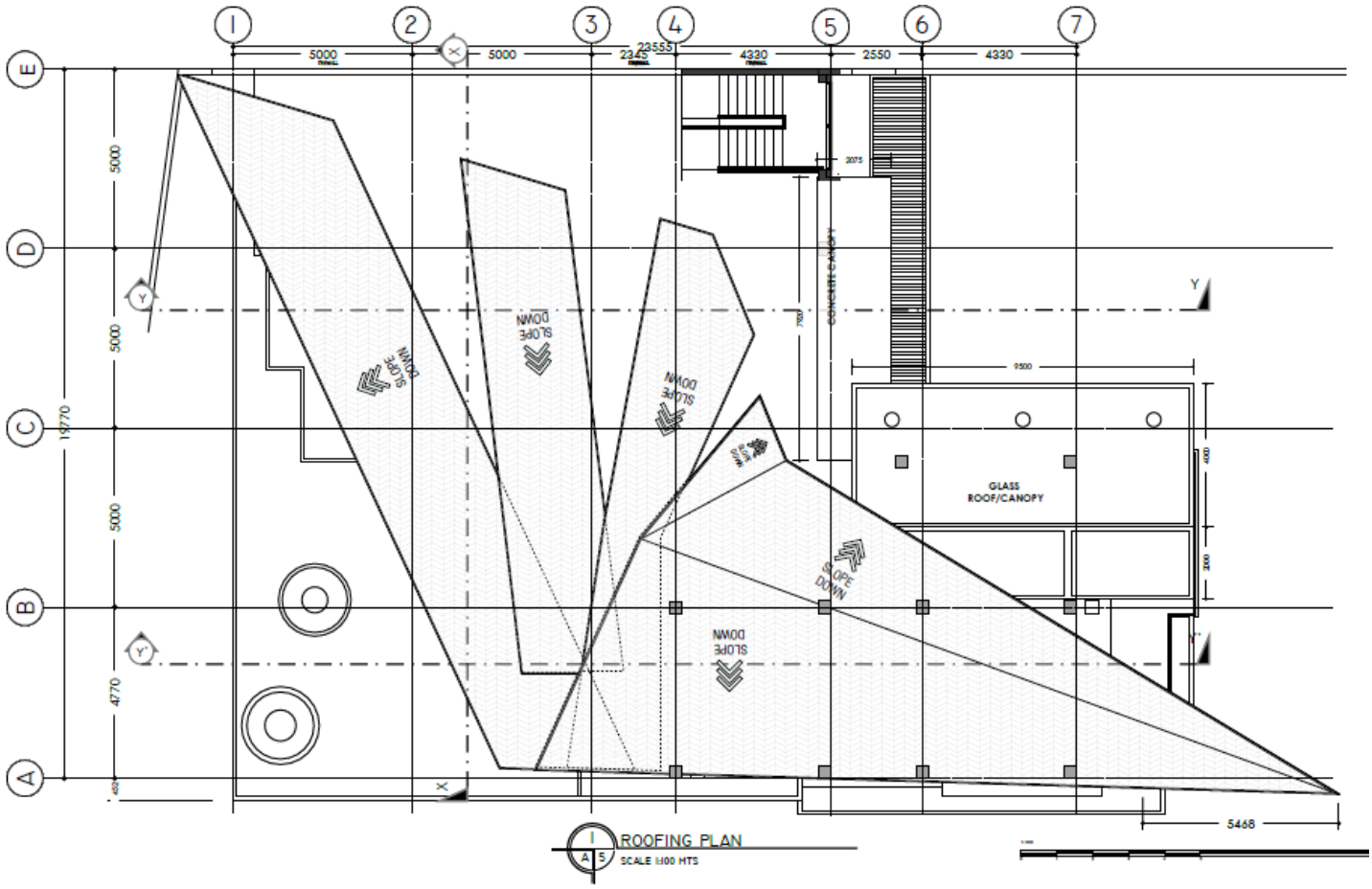


Figure 29

Roofing Plan of the Proposed Structure

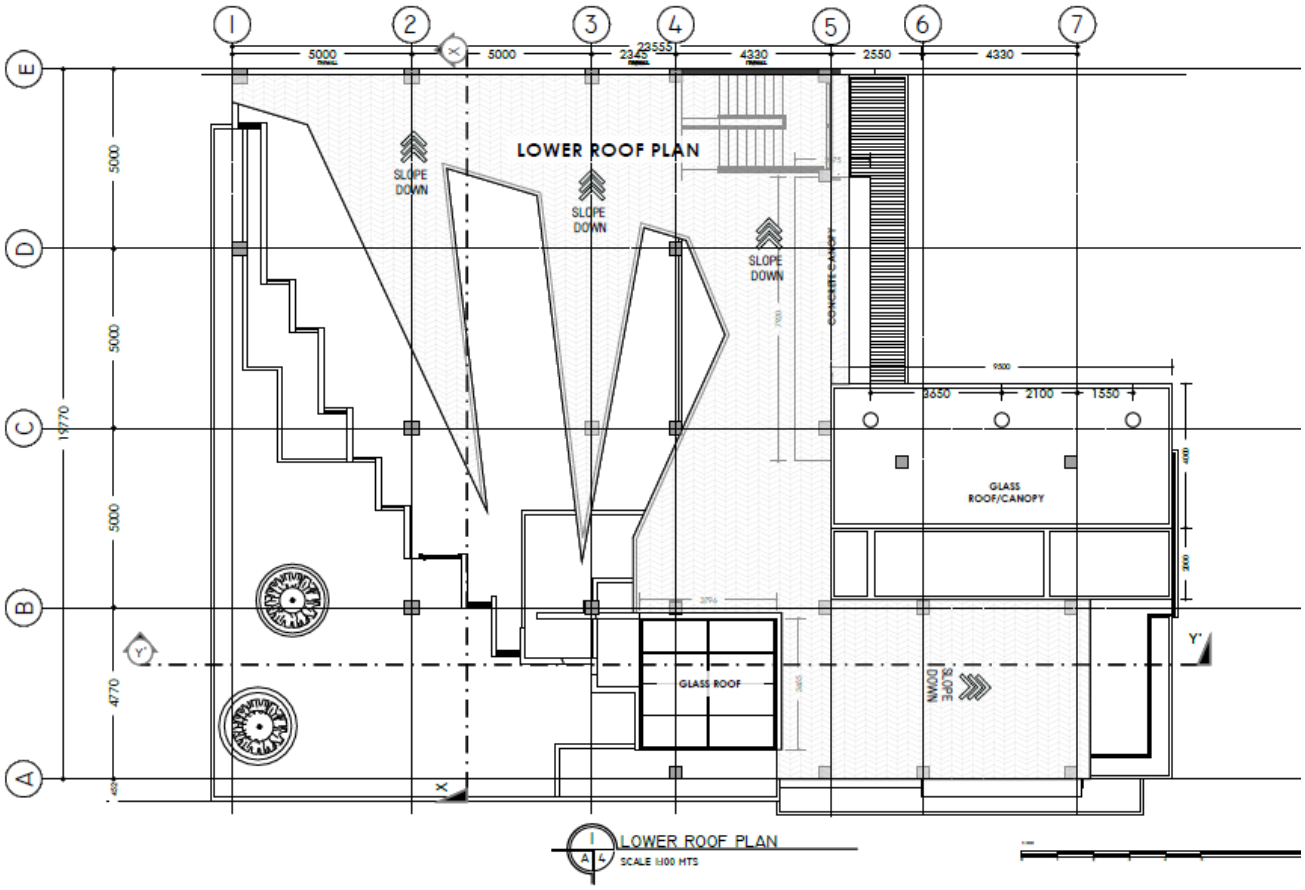


Figure 30

Lower Roof Plan of the Proposed Structure

5.1.2 Green Building Technology

The design includes utilizing accustomed lighting fixtures, use of windows for natural light and natural air flowing inside the building. The use of big windows gives ventilation and proper lighting which could reduce the use of air conditioning in other offices of the building which also contributes to the reduction of electric energy consumption as depicted in Table 13.

Table 13

Comparison of consideration of constraints for lightings

Options	Advantages	Disadvantages
Artificial Lighting	Gives extra time for work, studies, and leisure. Increases the safety levels Easier to control	Expensive Can have a negative effect on sleep patterns and overall health. High maintenance Less environmentally friendly
Natural Lighting	Affects the tone of colors and makes skin appear healthier. Improve mood, raise well-being, productivity, and overall happiness. Can decrease eye strain. Energy efficient	Produces an unpleasant glare Produce tremendous amounts of heat

(Based on 14 Pros and Cons of Artificial Light + Expert Facts, 2022 and M., 2018)

Natural lighting was the preferred choice because the municipality focuses on natural sources of lighting just like how their municipal hall was built. Despite its disadvantages, materials may make up for it to make sure that there is a complementary relationship between the functions of the building like how the green walls are used for the absorption of heat. It is also energy efficient as the building will likely reduce the use of electricity for the lights.

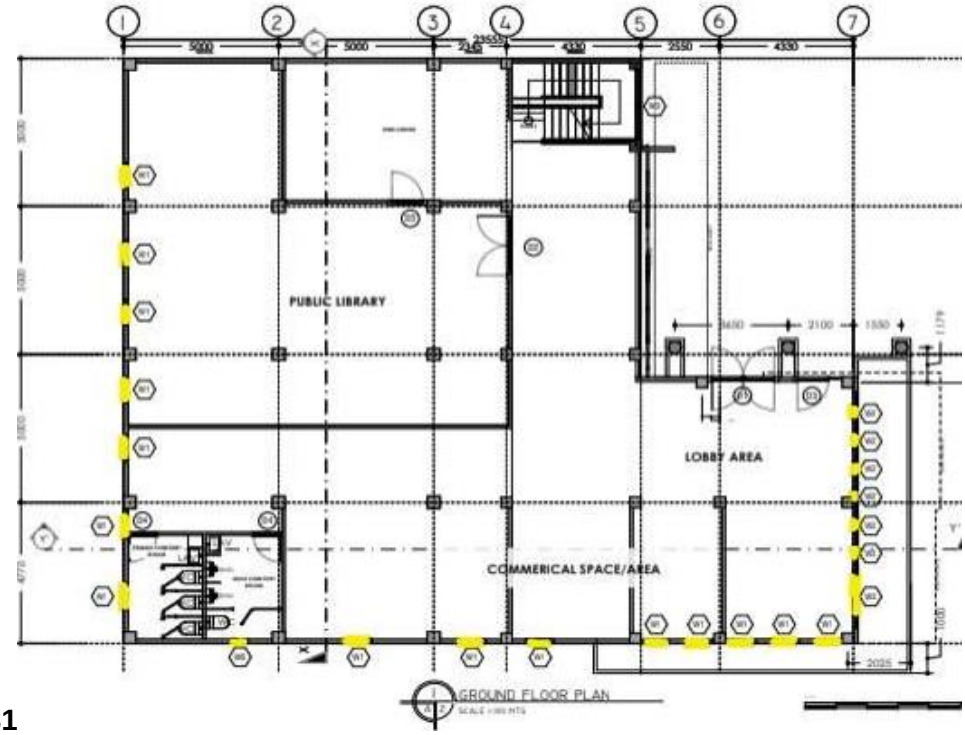


Figure 31

Ground Floor Plan highlighting the windows in yellow.

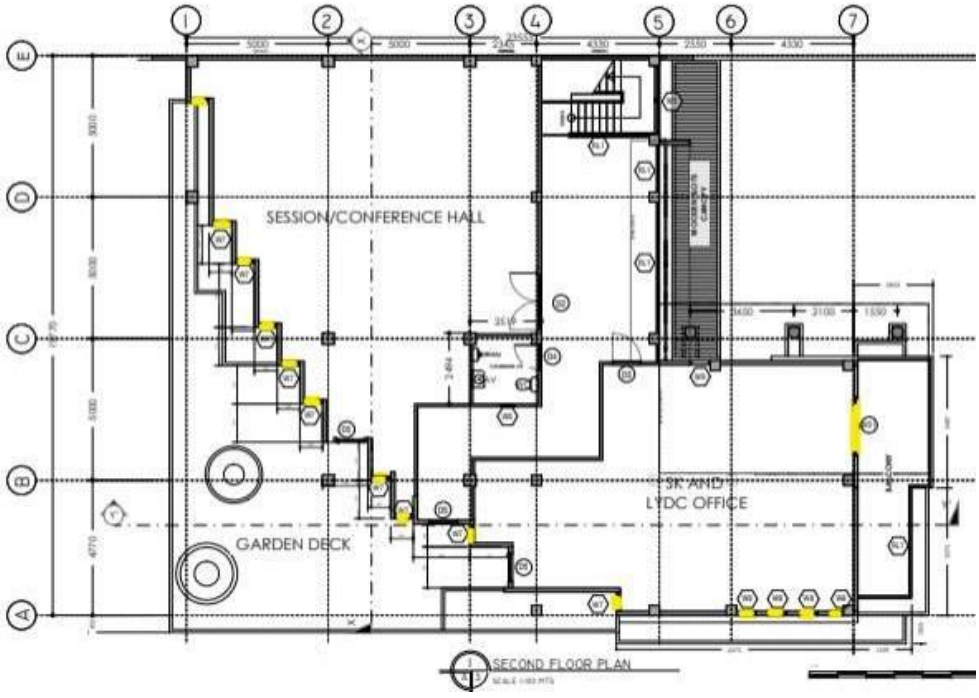


Figure 32

Second Floor Plan highlighting the windows in yellow.

As illustrated in figures 31 and 32, the ground floor and second floor are installed with thirty eight (38) varying sizes of windows. These windows allow direct sunlight, provide controlled natural ventilation, and make a vital contribution to the visual appeal of the proposed structure. Additionally, a polycarbonate glass roof was included in the design adding more natural light to pass in the building.

5.2 Technical Plans and Specifications

5.2.1 Architectural Design

The proposed two - storey youth center building in Lambunao, Iloilo has an architectural plan that encompasses a site development plan, perspective, floor plans, elevations, sections, schedules of doors and windows, and details of ramps and stairs. Also,the design includes the Person with Disabilities (PWD) and fire provisions. An expert in the field of architecture provided guidance to ensure that all plans were in compliance with the requirements set by the National Building Code of the Philippines.

The green building technologies such as natural lighting, sound-attenuating laminated panes, metal and polycarbonate glass roof, and green walls are embraced in the design of the proposed structure. The entire structure was constructed from concrete. Earthy tones that are rich and organic to establish the structure's mood. The majority of the hues utilized, from the earthy brown of the mud to the dark green of the leaves, could be easily found in nature and matched the intended occupation classification. A modern-style SK building with LYDC office has been erected, having a substantial positive impact and a pleasant, welcoming mood within the space. The details of the design are as follows:

Ground Floor.

The ground floor comprises a lobby area with a total gross floor area of 105 square meters. Adjacent to the lobby is the commercial spaces with a total gross floor

area of 96 square meters that can be equally divided into 3 to 4 business spaces. Additionally, on the left part of the ground floor is a public library with a total gross floor area of 115.50 square meters that can cater to a maximum of 40 local youths and is connected to a teen center with a total gross floor area of 34 square meters which can occupy 10 to 15 teens. Two comfort rooms, one each for males and females with a total gross floor area of 9.43 square meters provided with two lavatories, two urinals, and four water closets.

Second Floor

A conference hall is designated on the second floor of the proposed project with a total gross floor area of 134.50 square meters and can cater for 80 to 90 persons. Adjacent to the conference hall is the common comfort room for men and women with a total gross area of 6.28 square meters provided with one urinal, one water closet, and one lavatory. Walking upfront the hallway after the common cr is a door that leads to the garden deck with a total gross floor area of 87 square meters. Designated on the right side is the SK and LYDC office with a total gross floor area of 95 square meters that can cater to a maximum of 30 persons and is connected to a balcony with a total gross floor area of 14.97 square meters.

5.2.2 Structural Design

The structural plan for the proposed youth center contains the design of concrete slabs, beams, columns, footings, stairs, and ramps, all of which are load-bearing structural concrete members and were created in compliance with the National Structural Code of the Philippines (NSCP) 2015.

The structural analysis and design took into account certain material properties, including the compressive strength of concrete, which is 21 MPa, the yield strength of steel, which is 275 MPa, and the unit weight of concrete, which has a value of 23.6 kN/m3

5.2.2.1 Geotechnical Investigation

The soil samples taken from the project site were subjected to following laboratory tests: Sieve Analysis, Specific Gravity, Moisture Content, Unit Weight Analysis, and Compaction Test. Values of the geotechnical properties from the following soil tests conducted are reflected in Table 14 below.

Table 14

List of the geotechnical properties and corresponding values

Soil Type	Value
Specific Gravity	2.35
Moisture Content	42.49%
Unit Weight	3.58
Soil Type	SW-SM
Allowable Soil Bearing Capacity	363.80 KPa

5.2.2.2 Seismic Analysis

The seismic features of the project location were evaluated according to the code and presented in Table 15. This information was used to calculate the design base shear and ensure that the building can withstand lateral forces.

Table 15

List of the seismic properties and corresponding values required in the calculation of the design base shear of the proposed project.

Seismic Properties	Value
Importance Factor (Standard Occupancy)	1
Response Reduction Factor (SMRF), R	8.5
Seismic Source Type	A
Soil Profile Type	SD
Seismic Zone Factor, Z	0.4
Near Source Factor, Na	1
Near Source Factor, Nv	1.2
Seismic Coefficient, Ca	0.44
Seismic Coefficient, Cv	0.64
Ct (SMRF concrete)	0.0731
Hn	8.18m
Period, T	0.353s

5.2.3 Electrical Design

The power layout, lighting layout, specifications, and schedule of loads were included in the electrical design of the proposed two-storey farm school. For efficiency and sustainability, energy-saving fixtures were utilized in the design. All plans have complied with all rules and regulations of the latest Electrical Code of the Philippines and those of Local Electric Cooperative.

5.2.4 Plumbing Design

The plumbing design for the proposed project was based on the provisions of the Philippine Plumbing Code, National Building Code, and the rules and regulations of the local

municipality. Detailed specifications were found in the Plumbing plans: General notes and material specifications, plumbing layout, isometric view, septic vault details, plumbing details, and other important fixtures' details. The primary source of water was a deep well which was selected based on the capacity and savings comparison of three available water sources in the structure. The septic tank is positioned on the rear side of the structure in consideration of occupants' safety and sanitation. The project also included a rainwater harvesting system as its additional water source and as part of the structure's sustainable feature.

5.3 Project Cost and Scheduling

The estimated total cost of the project was PHP 22,188,008.49, which included the following item of work: earthworks, concrete works, masonry works, architectural works, plumbing works, and electrical works. A detailed breakdown of project cost and estimates could be found in Appendix F.

Table 16

Project Cost Estimates

Project Cost and Estimates	
Description	**Cost (PHP)**
General Requirements (Permits and Clearances, Project Billboard/Signboard, Occupational Safety and Health Program, and Mobilization/Demobilization)	1,061,980.00
Temporary Facility for Engineers (Provision of Office and Maintenance of the Office for the Engineer)	207,500.00
Earthworks (Clearing and Grubbing, Lay-outing and Staking, Excavation, and Embankment)	372,656.51
Reinforcing Steel Bars (Isolated Footing, Footing Tie Beam, Columns, Girders, Slabs, and Staircase)	2,995,721.88
Concrete Works (Isolated Footing, Footing Tie Beam, Columns, Girders, Slabs, and Staircase)	2,910,620.50
Masonry Works (CHB Walls, and Finishing Works)	2,482,699.44
Formworks and Scaffoldings	829,835.00
Architectural Works (Tile Works, and Painting Works)	1,301,746.00
Roofing Works (Roof Framing, and Roof Works)	1,146,622.00
Openings (Doors and Windows)	939,505.75
Electrical Works	354,176.00
Plumbing Works	219,426.40

Labor Cost	4,239,746.64
Overhead Expenses	1,130,599.16
Contingencies and Miscellaneous	565,299.58
Contractor's Profit Margin	1,413,248.95
Value Added Tax (VAT)	706,624.47
TOTAL PROJECT COST	22,188,008.49

The project will be constructed in 210 days. The costs are based on cost per unit prices. The detailed project scheduling may be found in Appendix H.

5.4 Construction Work Schedule

The estimated project duration of the proposed two-storey SK building with LYDC office was 198 days. The sequencing of activities and the S-Curve is provided in Appendix C.

5.5 General Specifications

5.5.1 Preparation of Site Excavation

The task included all necessary equipment, personnel, and other works and supplies to complete the site work. The structure was made of high-quality, standard materials that suited the intended function.

5.5.2 Clearing of the Site

Proper disposal and clearance from all debris and obstructions were done within the limits of the site. Anything that was intended or designated to stay for additional purposes should be preserved.

5.5.3 Excavation

The size of the excavation was determined by the dimensions of the drawings in the plans. The engineer or architect must direct any unexpected excavation works especially at inapplicable bearings indicated at specific elevations. Before any footing is placed on fill, the structural engineer must approve it. The bottom must be clean, compacted, and flat, with adequate space for floor slabs and other materials for inspection. Filling was done if any error occurs.

5.5.4 Filling and Backfilling

Due to the general geography, the majority of the land must be filled to level the ground. Before adding another layer of soil, the roller should make 4-8 passes. Backfilling materials must be authorized and symmetrically applied on both sides. Before backfilling, structures must obtain sufficient strength. Surplus materials must be hauled away appropriately and graded to a consistent level surface.

Compaction of fill was uniform in layers of thickness that is appropriate to the nature of the material and the compaction equipment that will be used. Slopes must be benched and roughened crosswise to enable for the application of filling in layers and the prevention of interface slide failures**.**

5.5.5 Materials

All materials are provided in strict conformity with the standards, which are the best that the market has to offer. Portland cement bags must be appropriately kept in a weatherproof building. Water that is devoid of alkaline, oils, acids, organic compounds, and other substances that might impact the qualities of concrete and steel should be used in mixing.

Fine aggregates must be clean and made of usable and appropriate sand. Coarse aggregates consist of gravel or crushed stone with the size of 38 mm to 50 mm. It should be clean and devoid of anything that might harm the concrete structure.

5.5.6 Concrete and Masonry Works

The following proportions was followed in all concrete works, unless otherwise indicated in the drawings:

Class A concrete mix was used for footings, columns, beams, stairs and walls less than 10 cm thick

Class B concrete mix was used for walls more than 10 cm thick

Class C concrete mix was used for concrete fillers.

Cement mortar mixes were for plaster works. General conditions were applied to all works and the entire construction. This includes the concrete hollow block partitions, concrete slabs, walls, foundations and any other concrete and masonry works included in the plans.

5.5.7 Formworks

Formworks must be able to bear the loads applied by the concrete vibrator while remaining in place throughout the procedure. It was removed properly after the maximum strength of the concrete was achieved.

5.5.8 Curing

For at least seven days, all concrete must be moist cured using an approved method and a locally appropriate measure based on local conditions. It must be done as soon as the water has disappeared from the surface. It must be kept continuously wet and covered with burlap plastics or other suitable material.

5.5.9 Steel Works

Rust, scale, grease, oil, and other foreign substances or qualities that would undermine the steel bars' bonding with concrete and the structure's strength should be avoided.

Steel reinforcement with suitable grade and length shall be provided based on what is mentioned in the drawings and plans. It must also pass all essential steel reinforcement tests. Work of other parts should be supplied for the installation that does not compromise the structural integrity or attractiveness**.**

5.5.10 Plumbing and Drainage Installation

The installment of the plumbing and drainage system conformed with the pertinent provision of the Code of Sanitation of the Philippines and the National Plumbing Code of the Philippines. Before being installed, drainage pipes and fittings must be examined. All plumbing fixtures are to be properly spaced for accessibility for their intended use. The piping system was not projected beyond the walls or steel lines nor shall they be hanged below slabs more than absolutely necessary. Registered Master Plumbers must design and construct the pipes required. Equipment and materials must be made of durable materials, free of defects in craftsmanship, and maintained to prevent clogging, solid deposit, and fouling, with enough cleanouts for easy cleaning. To avoid leakage, the septic tank must be watertight and located far

enough away from the current water supply. Tests and adjustments for the plumbing system were made for the avoidance of defection in workmanship.

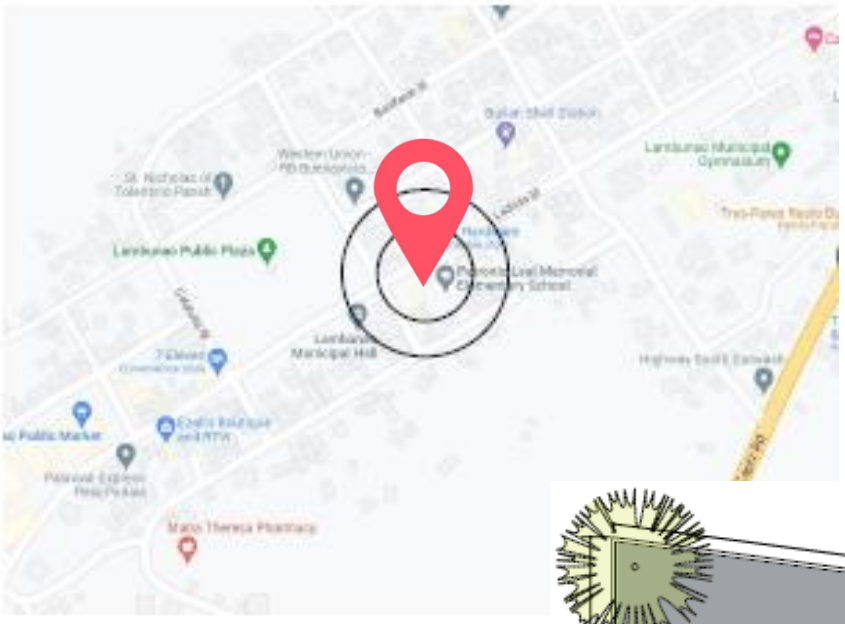
5.5.11 Electrical Works

The Philippine Electrical Code and the standard ways of the electrical utility provider must be followed in every area of the installation of electrical works. The installation must be planned up in a way that the work must result in clean and visually appealing results. If the materials are substandard or destroyed during the construction process, the electrical work should be changed.

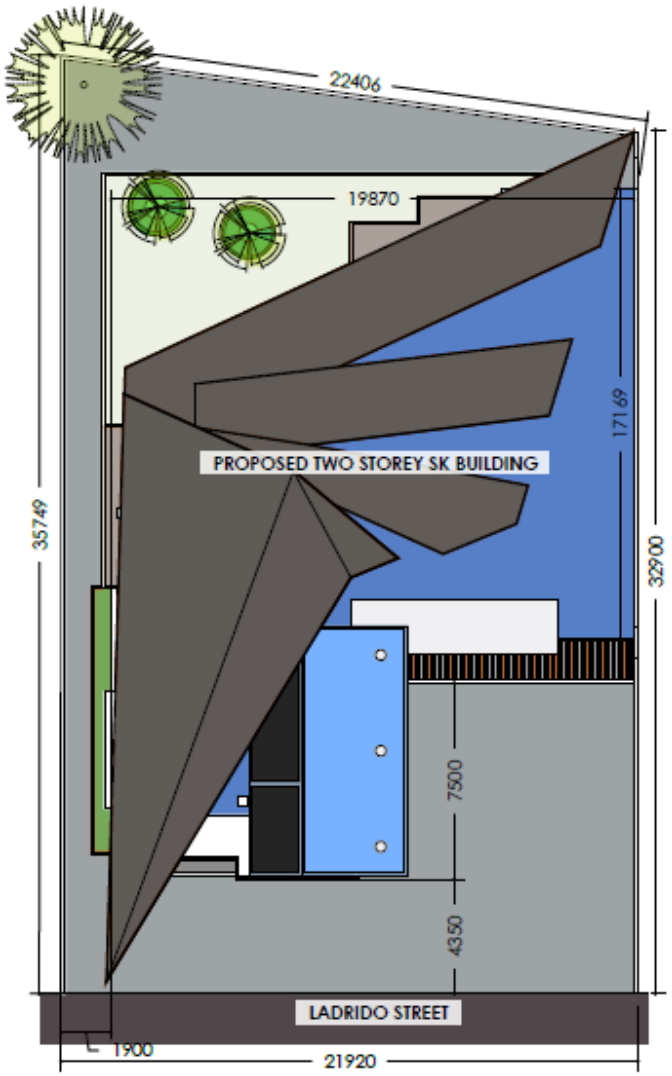
ARCHITECTURAL PLANS

EXTERIOR PERSPECTIVE

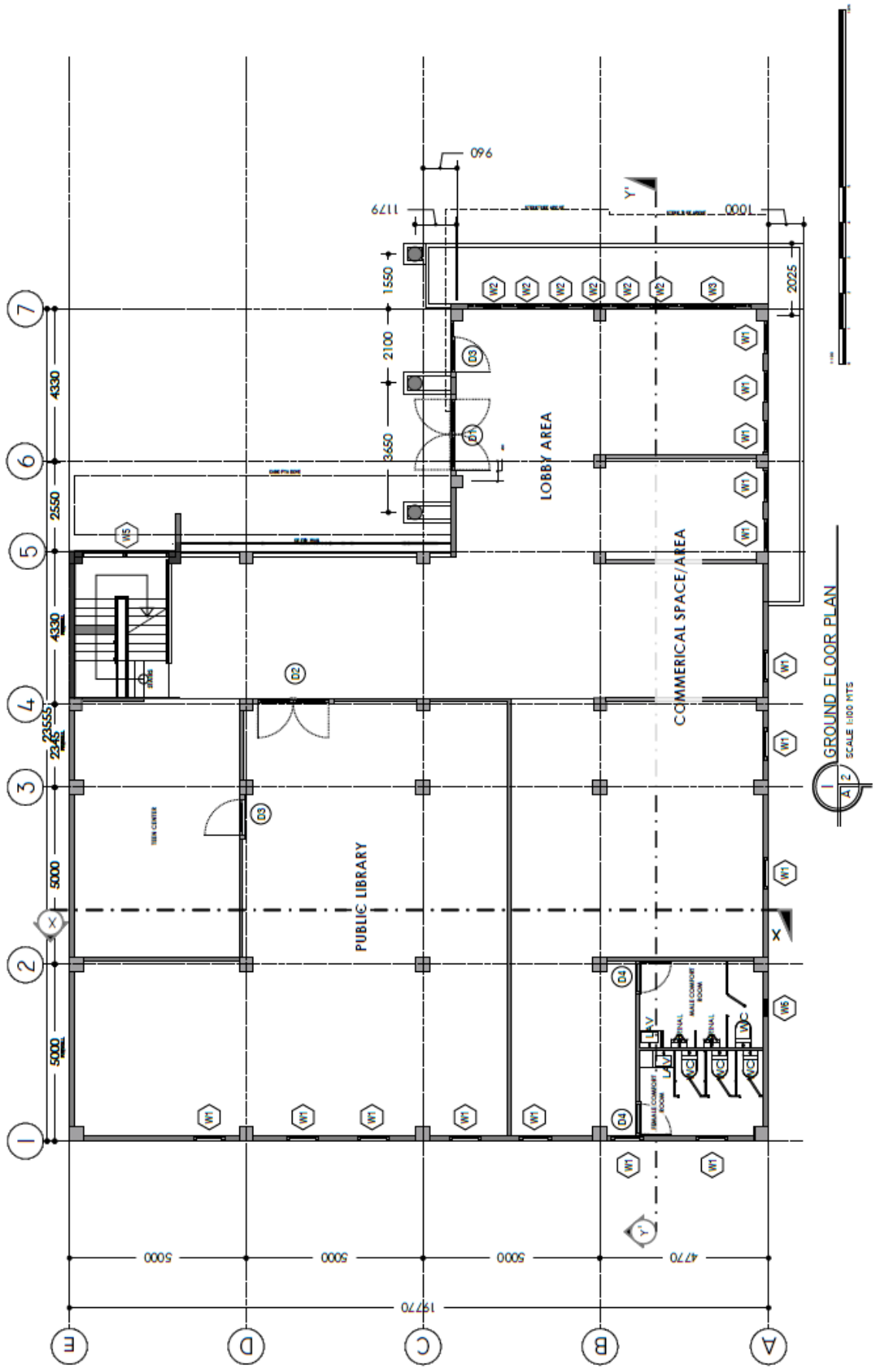
SCALE NTS

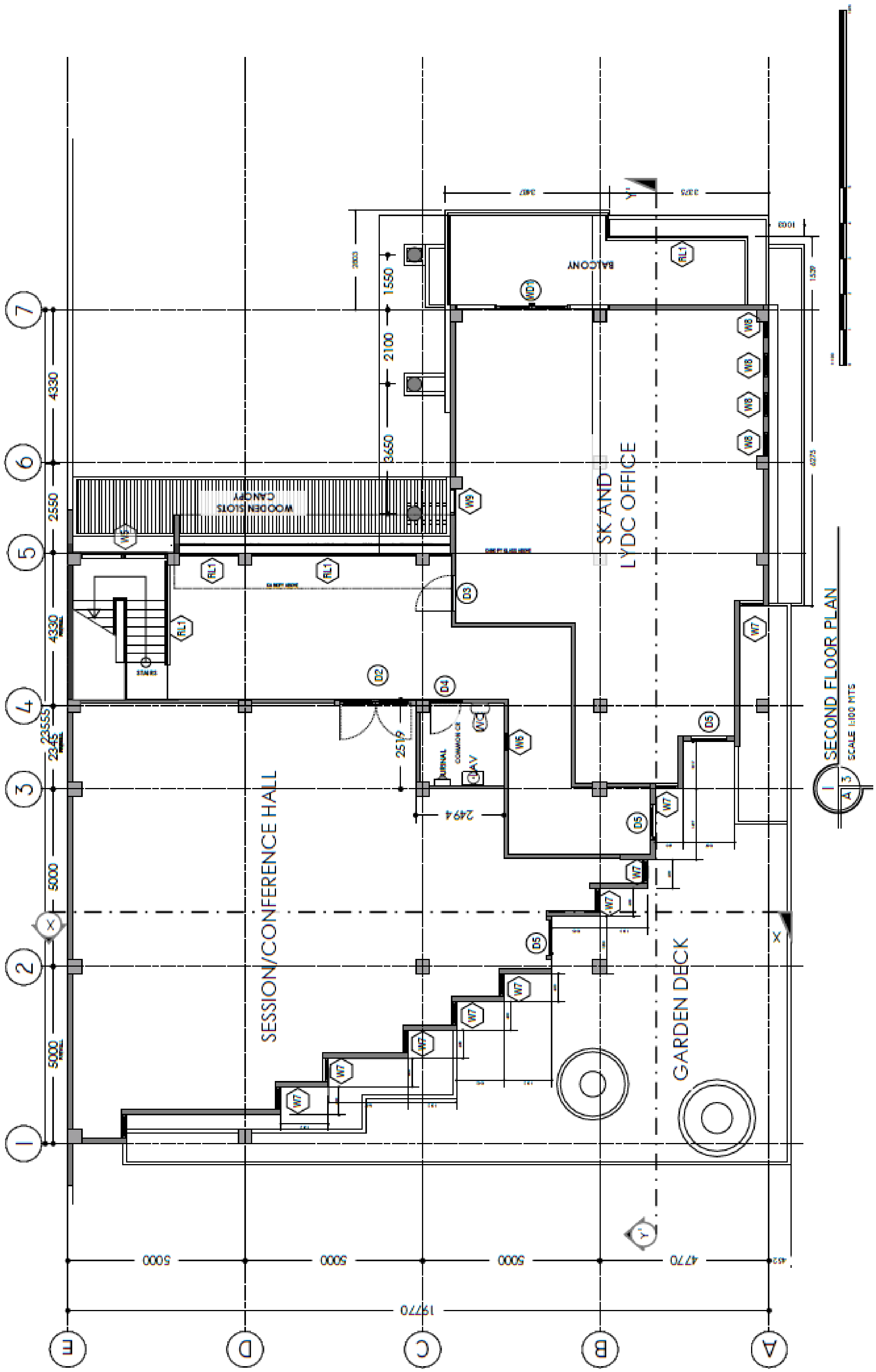


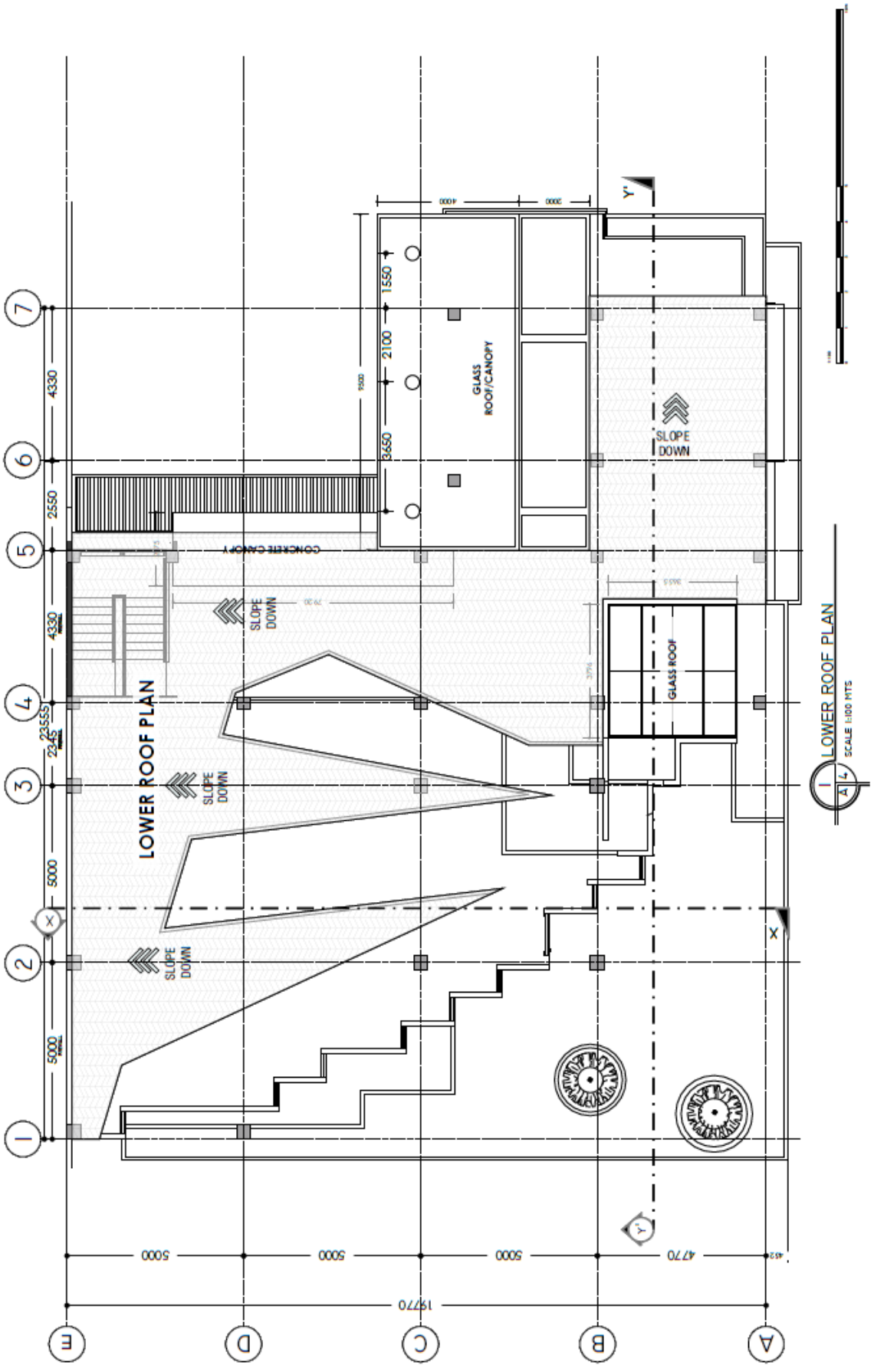
2 A I VICINITY MAP
SCALE NTS

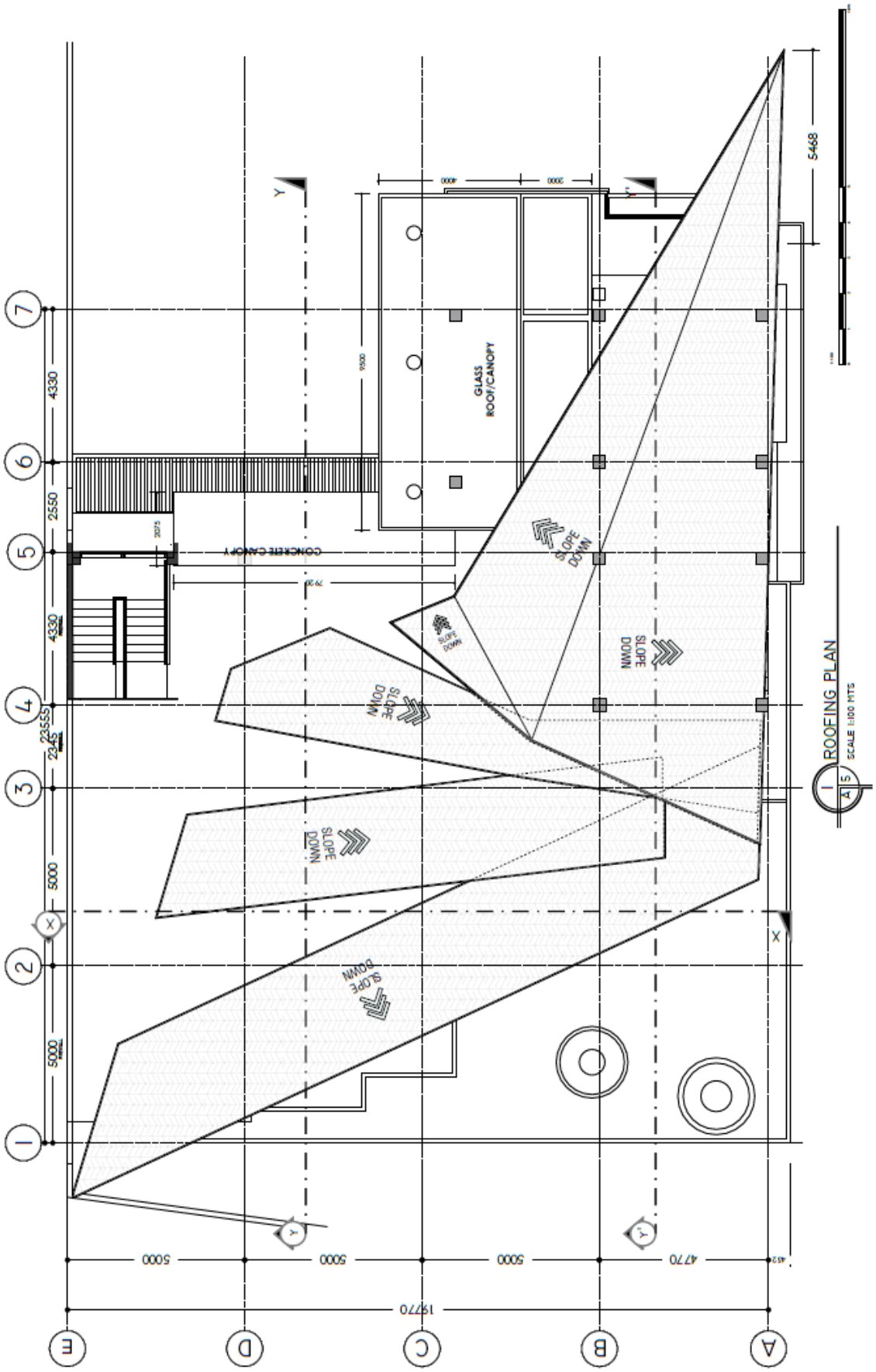


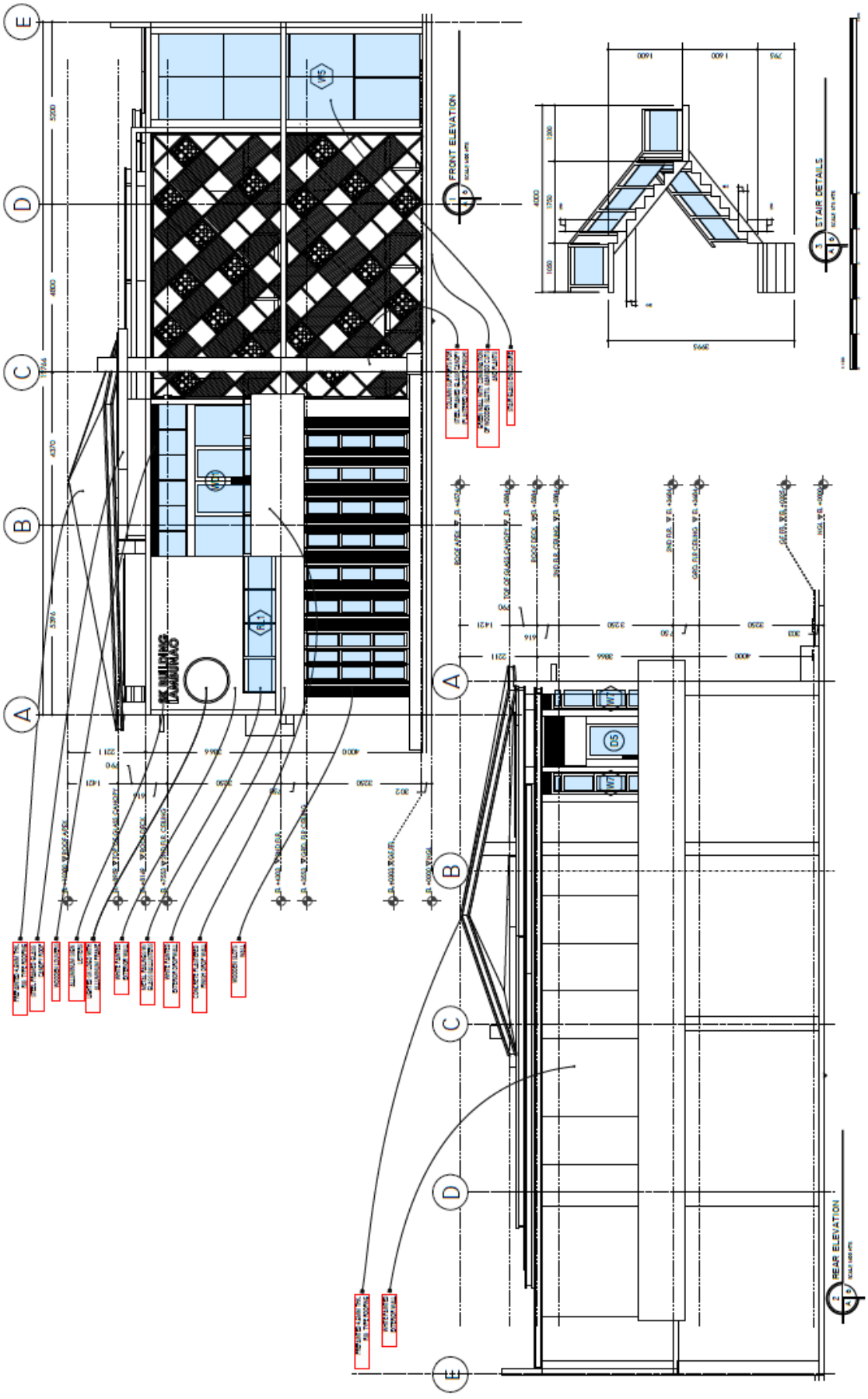
3 A I SITE DEV'L PLAN
SCALE 1:200 MTS

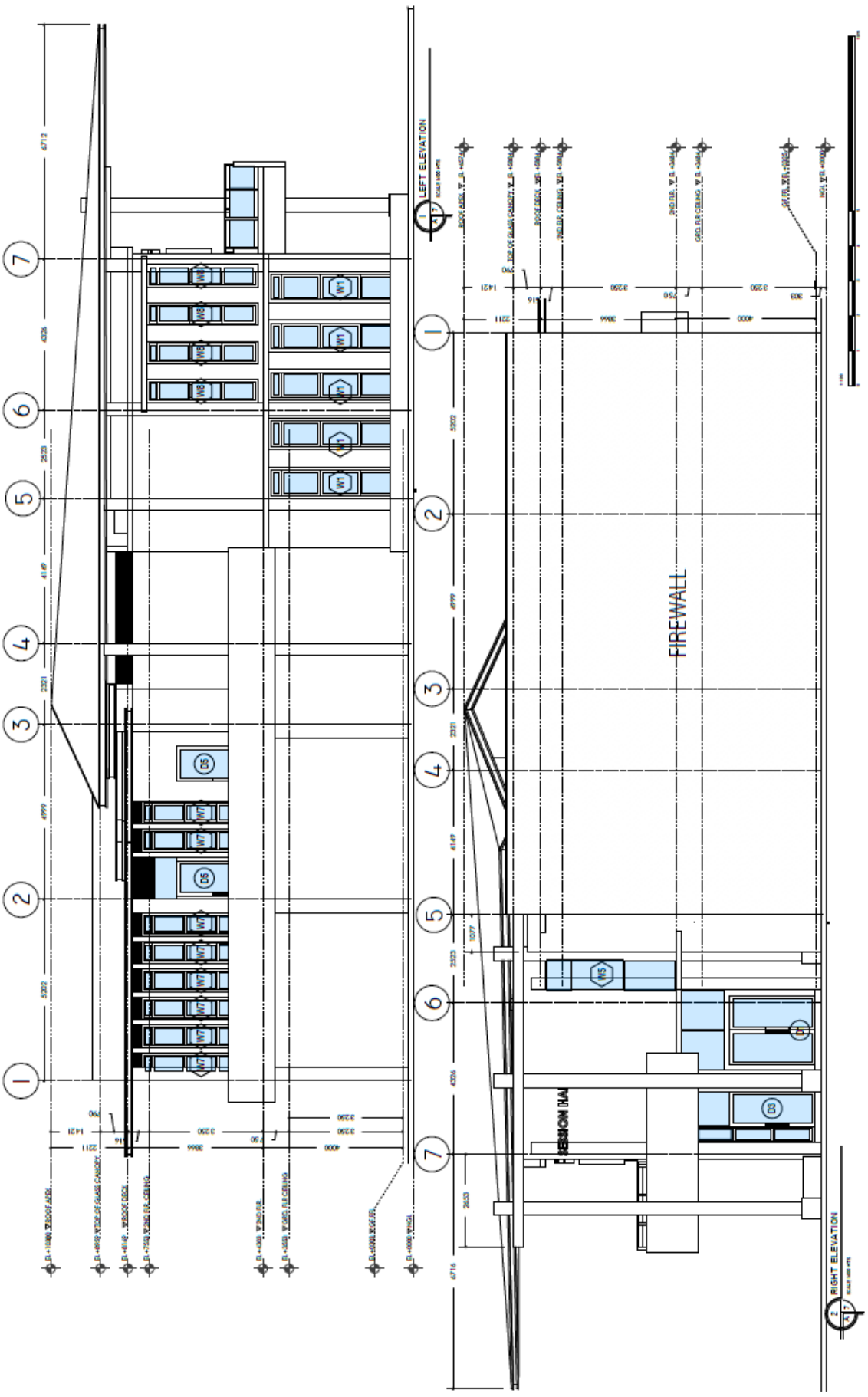

LOBBY AREA
COMMERICAL SPACE/AREA
PUBLIC LIBRARY
GROUND FLOOR PLAN
SCALE 1:100 MTS
19770
5000
5000
5000
4770
1000
960
1179
1550
2100
3650
2025
4330
2550
4330
5000
5000
23555
2345

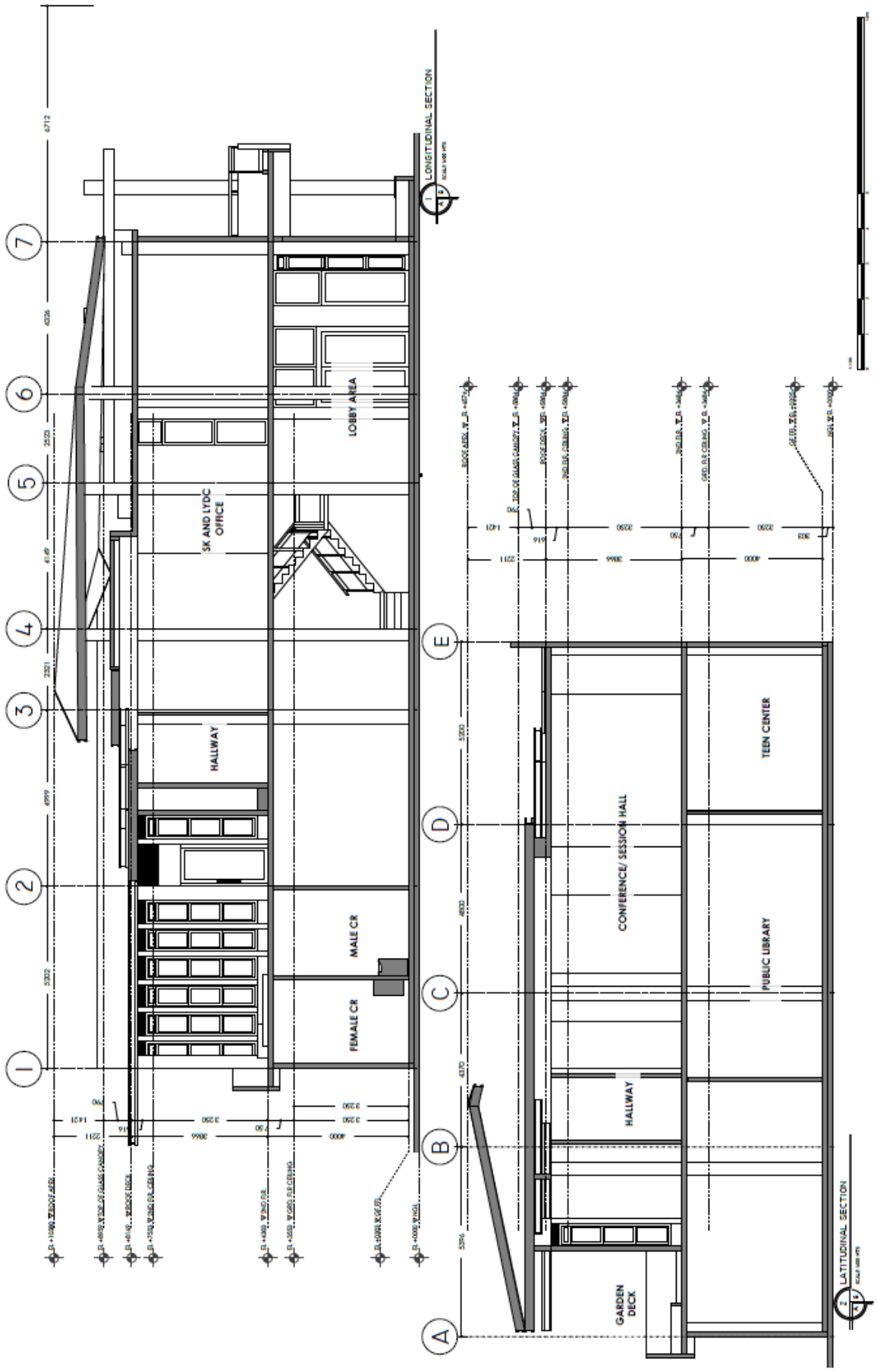

SESSION/CONFERENCE HALL
SK AND LYDC OFFICE
GARDEN DECK
WOODEN SLOTS CANOPY
BALCONY
STAIRS
SECOND FLOOR PLAN
SCALE 1:100 MTS
19770

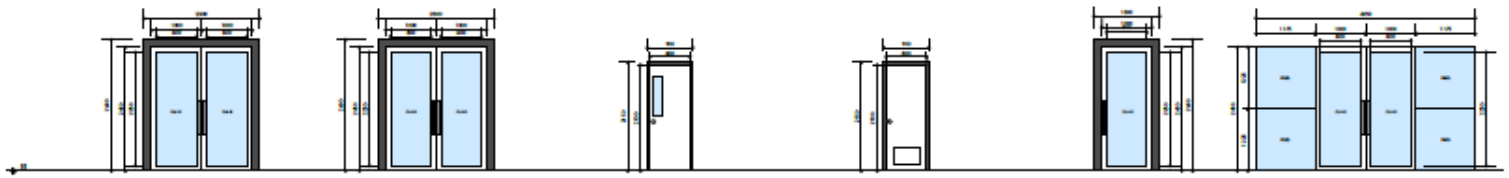

LOWER ROOF PLAN
SCALE 1:100 MTS
GLASS ROOF/CANOPY
GLASS ROOF
CONCRETE CANOPY
SLOPE DOWN
SLOPE DOWN
SLOPE DOWN
SLOPE DOWN
LOWER ROOF PLAN
1550
2100
3650
4330
2550
4330
2355
2345
5000
5000
5000
5000
5000
4770
19770
A
B
C
D
E
1
2
3
4
5
6
7
X
X'
Y'


ROOFING PLAN
SCALE 1:100 MTS
GLASS ROOF/CANOPY
CONCRETE CANOPY
SLOPE DOWN
5468
19770
5000
4770
4330
2550
2355
2445
9000


FRONT ELEVATION
STAIR DETAILS
REAR ELEVATION

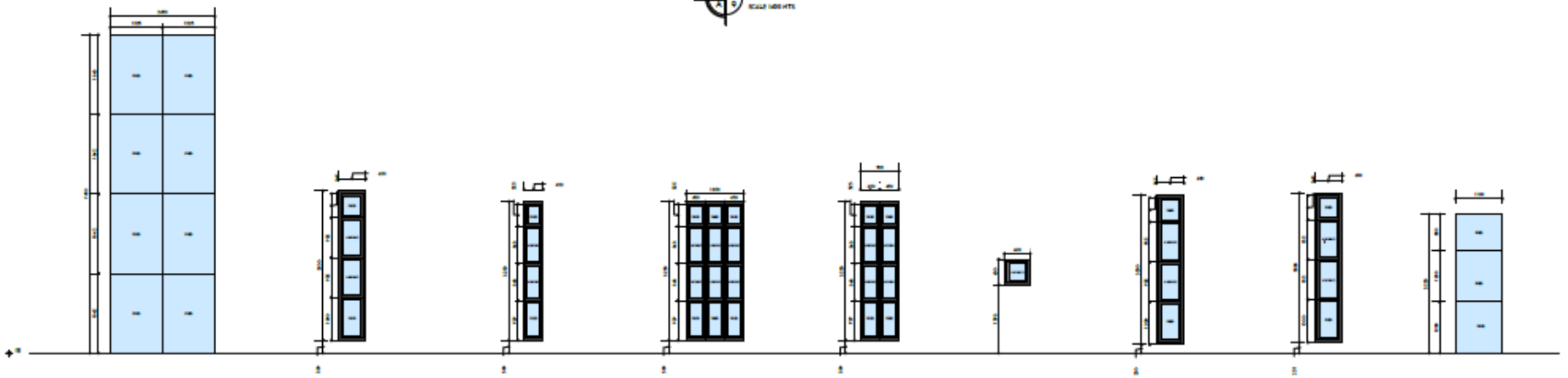

1 LEFT ELEVATION
FIREWALL
2 RIGHT ELEVATION


LONGITUDINAL SECTION
LOBBY AREA
SK AND LYDC OFFICE
HALLWAY
MALE CR
FEMALE CR
CONFERENCE/ SESSION HALL
HALLWAY
TEEN CENTER
PUBLIC LIBRARY
GARDEN DECK
LATITUDINAL SECTION



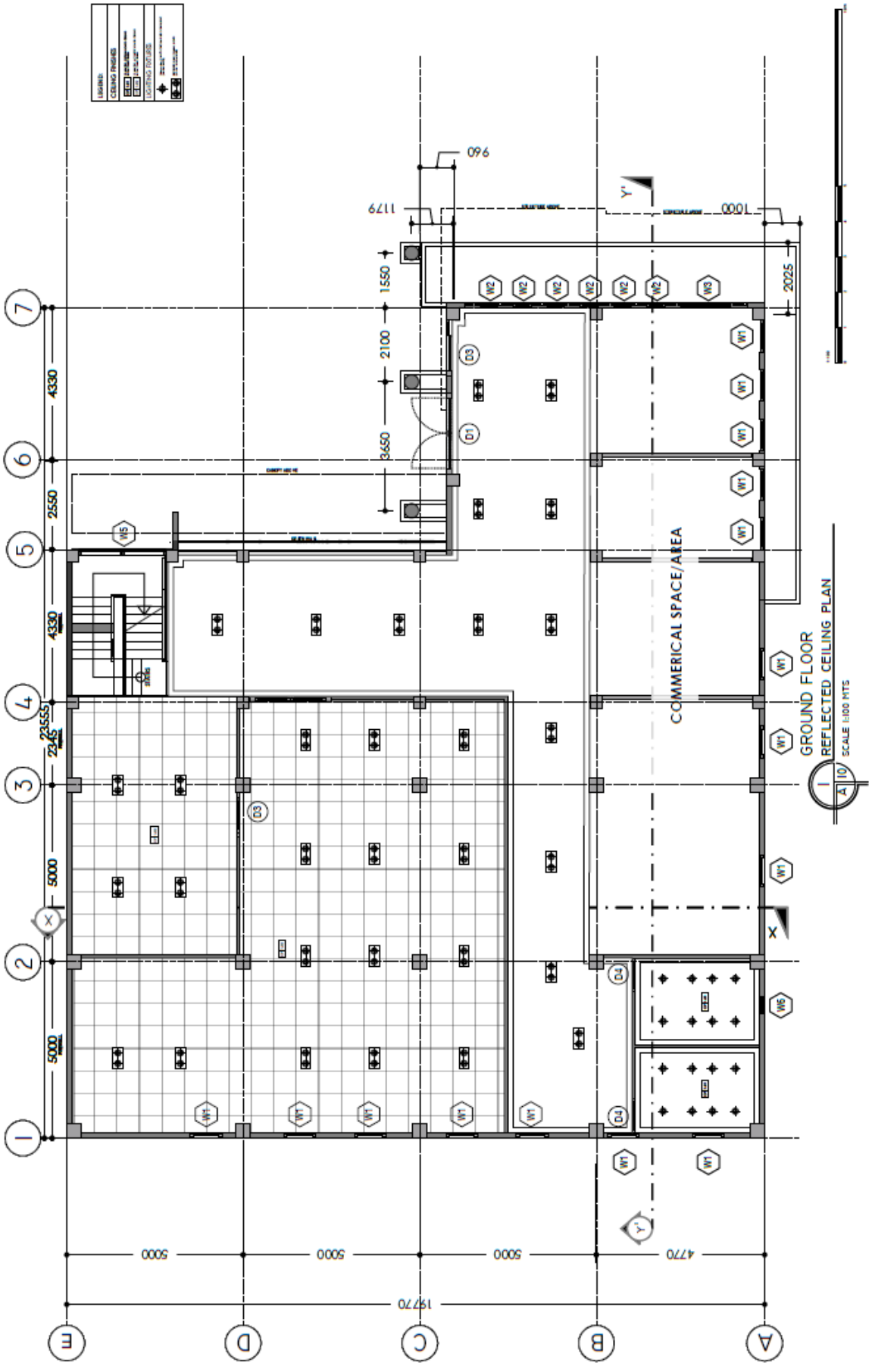
MARK	D1	MARK	D2	MARK	D3	MARK	D4	MARK	D5	MARK	WD1
TYPE	ALUMINUM FRAMED GLASS DOOR	TYPE	ALUMINUM FRAMED GLASS DOOR	TYPE	SOLID CORE FLUSH DOOR WITH GLASS	TYPE	FLUSH TYPE PVC DOOR	TYPE	ALUMINUM FRAMED GLASS DOOR	TYPE	ALUMINUM FRAMED GLASS DOOR WITH FIXED GLASS
FINISHES	WOOD FINISH 35MM THK. ALUMINUM FRAME, REFLECTED TEMPERED GLASS DOUBLE SWING DOOR	FINISHES	WOOD FINISH 35MM THK. ALUMINUM FRAME, REFLECTED TEMPERED GLASS DOUBLE SWING DOOR	FINISHES	PAINTED FINISHED	FINISHES	PVC FINISHED	FINISHES	WOOD FINISH 35MM THK. ALUMINUM FRAME, REFLECTED TEMPERED GLASS SWING DOOR	FINISHES	WOOD FINISH 35MM THK. ALUMINUM FRAME, REFLECTED TEMPERED GLASS DOUBLE SWING DOOR AND FRAMED CURTAIN GLASS
LOCKSET	ZINC COATED LOCKSET SECURITY LOCK	LOCKSET	ZINC COATED LOCKSET SECURITY LOCK	LOCKSET	ZINC COATED LOCKSET SECURITY LOCK	LOCKSET	ZINC COATED PRIVACY LOCK	LOCKSET	ZINC COATED LOCKSET SECURITY LOCK	LOCKSET	ZINC COATED PRIVACY LOCK
LOCATION	MAIN BUILDING ACCESS	LOCATION	CONFERENCE/SESSION HALL MAIN DOOR	LOCATION	OFFICE, BACKSTAGE AND MEDIA ROOM DOORS	LOCATION	TOILET DOORS	LOCATION	OFFICE DOORS TO GARDEN DECK	LOCATION	TOILET DOORS
REQUIRED	1 SET	REQUIRED	1 SET	REQUIRED	4 SET	REQUIRED	4 SET	REQUIRED	3 SET	REQUIRED	1 SET

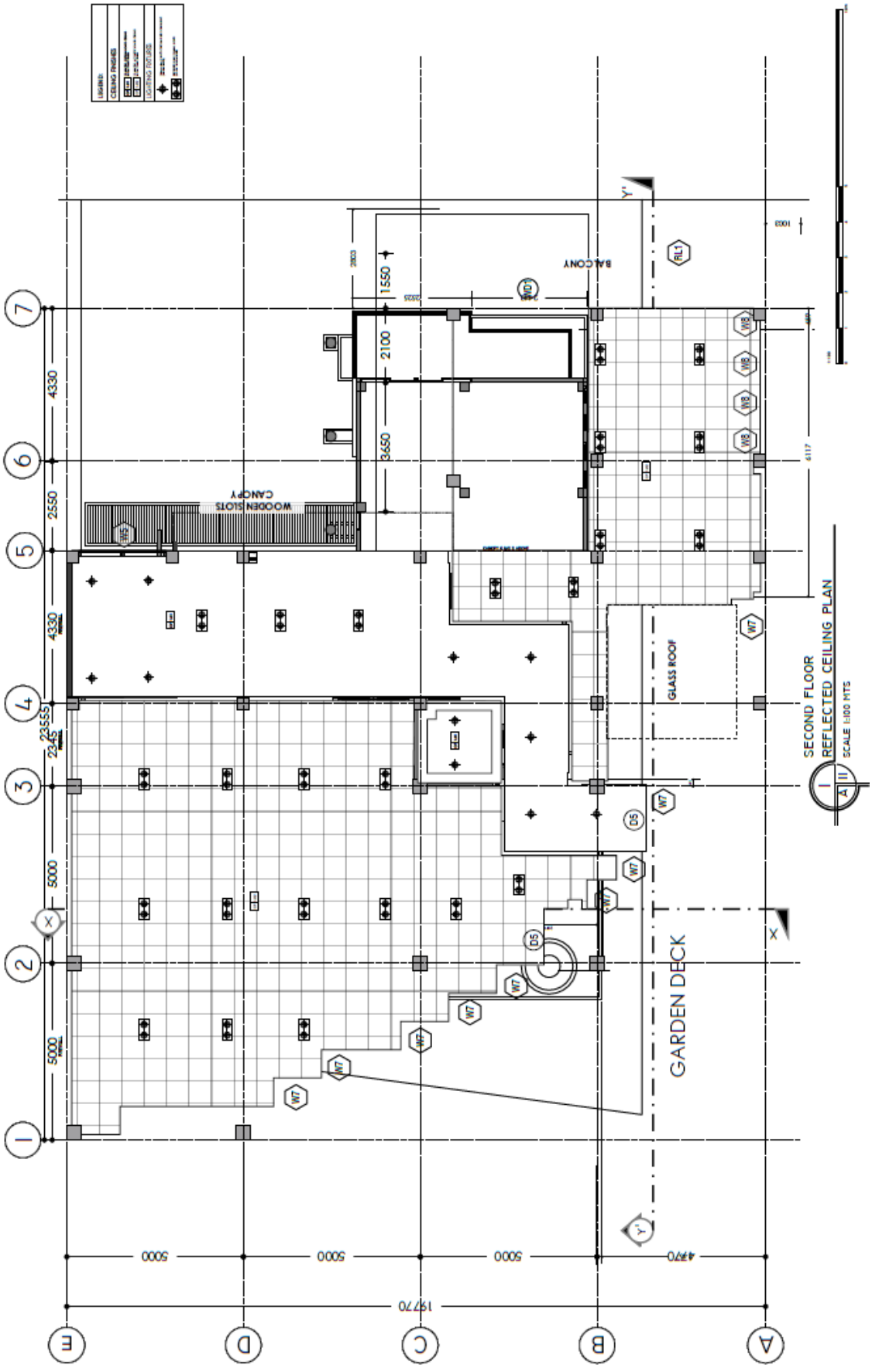
1 A9 SCHEDULE OF DOORS
SCALE: NOS HTS



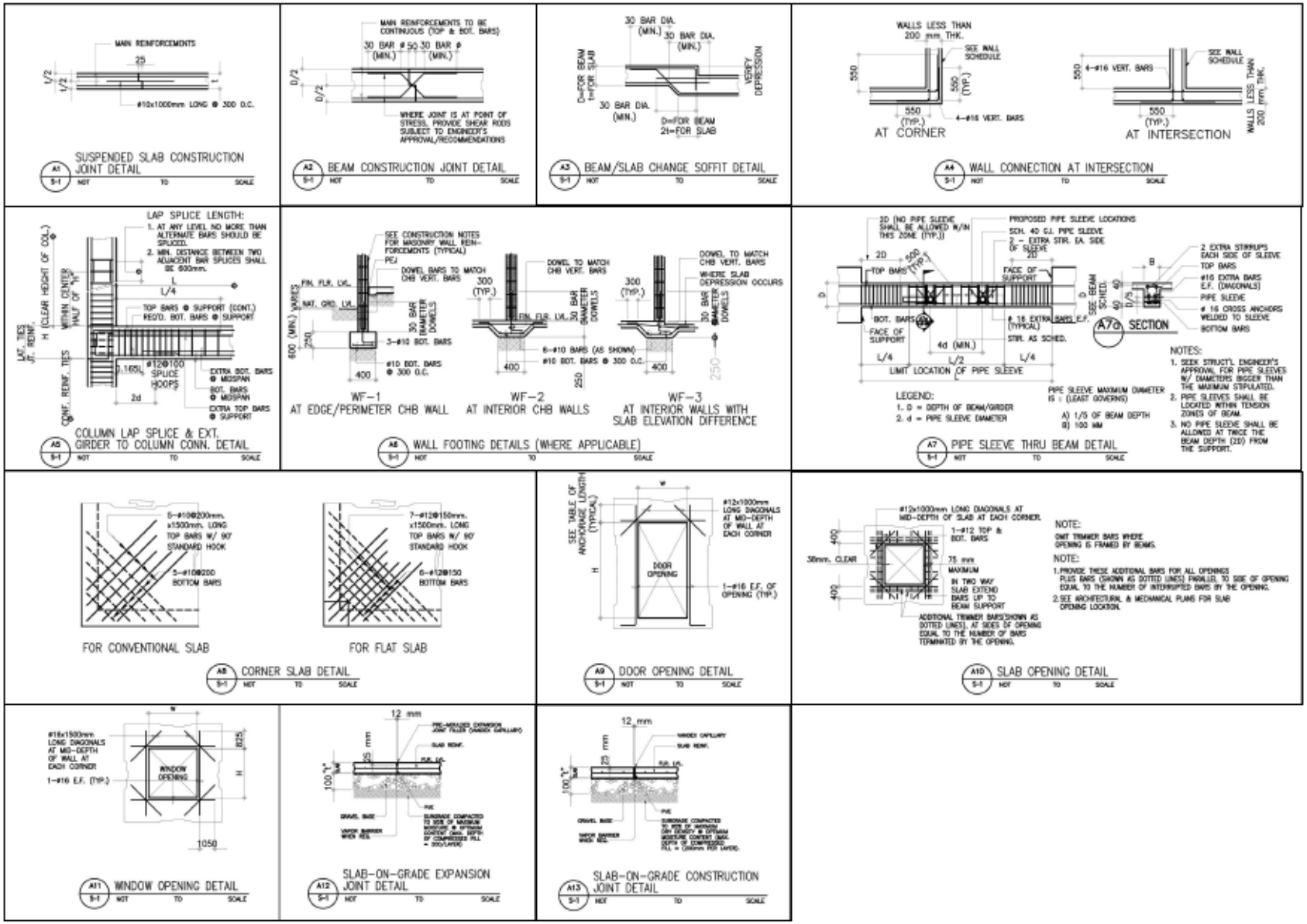
MARK	W0	MARK	W1	MARK	W2	MARK	W3	MARK	W4	MARK	W5	MARK	W7	MARK	W8	MARK	W9
TYPE	ALUMINUM FRAMED FIXED WINDOW	TYPE	ALUMINUM 3 AWNING FIXED WINDOW	TYPE	ALUMINUM 3 AWNING FIXED WINDOW	TYPE	ALUMINUM AWNING FIXED WINDOW	TYPE	ALUMINUM SLIDING FIXED WINDOW	TYPE	ALUMINUM SLIDING FIXED WINDOW	TYPE	ALUMINUM SLIDING FIXED WINDOW	TYPE	ALUMINUM SLIDING FIXED WINDOW	TYPE	ALUMINUM FRAMED FIXED WINDOW
FINISHES	ALUMINUM POWDER COATED BLACK	FINISHES	ALUMINUM POWDER COATED BLACK	FINISHES	ALUMINUM POWDER COATED BLACK	FINISHES	ALUMINUM POWDER COATED BLACK	FINISHES	ALUMINUM POWDER COATED BLACK	FINISHES	ALUMINUM POWDER COATED BLACK	FINISHES	ALUMINUM POWDER COATED BLACK	FINISHES	ALUMINUM POWDER COATED BLACK	FINISHES	ALUMINUM POWDER COATED BLACK
LOCKSET	NA	LOCKSET	LEVER LOCK	LOCKSET	LEVER LOCK	LOCKSET	LEVER LOCK	LOCKSET	LEVER LOCK	LOCKSET	LEVER LOCK	LOCKSET	LEVER LOCK	LOCKSET	LEVER LOCK	LOCKSET	LEVER LOCK
LOCATION	STAIRS	LOCATION	SESSION HALLS AND LOBBY	LOCATION	CONCIERGE	LOCATION	LOBBY/CONCIERGE	LOCATION	MEDIA ROOM	LOCATION	COMFORT ROOM	LOCATION	SE OFFICE	LOCATION	DTEC OFFICE	LOCATION	DTEC OFFICE
REQUIRED	1 SET	REQUIRED	12 SET	REQUIRED	4 SET	REQUIRED	1 SET	REQUIRED	1 SET	REQUIRED	4 SET	REQUIRED	9 SET	REQUIRED	4 SET	REQUIRED	1 SET

3 A9 SCHEDULE OF WINDOWS
SCALE: NOS HTS


COMMERICAL SPACE/AREA
GROUND FLOOR
REFLECTED CEILING PLAN
SCALE 1:100 MTS
19770
5000
5000
5000
4770
4330
2550
4330
2345
2355
5000
5000
1550
2100
3650
1179
960
1000
2025


SECOND FLOOR
REFLECTED CEILING PLAN
SCALE 1:100 MTS
GARDEN DECK
GLASS ROOF
WOODEN SLOTS
CANOPY
BALCONY
19770
5000
4970
4330
2550
2355
1550
2100
3650

STRUCTURAL PLANS



NOTE:
ANY DESCREPANCY MUST BE VERIFIED WITH ARCHITECT AND ENGINEER

TYPICAL RC DETAILS & CONSTRUCTION NOTES

CONSTRUCTION NOTES

A. GENERAL

1. CONSTRUCTION NOTES AND TYPICAL DETAILS APPLY TO ALL DRAWINGS UNLESS OTHERWISE SHOWN ON NOTES. MODIFY TYPICAL DETAILS AS DIRECTED TO MEET SPECIAL CONDITIONS.
2. SHOP DRAWINGS WITH ERECTION AND PLACING DIAGRAMS OF ALL STRUCTURAL STEEL, MISCELLANEOUS IRON, PRE-CAST CONCRETE ETC. SHALL BE SUBMITTED FOR ENGINEER'S APPROVAL BEFORE FABRICATION.
3. CONTRACTOR SHALL VERIFY ALL DIMENSIONS BEFORE ALL WORK IS TO BEGIN, CHECK WITH MECHANICAL AND ELECTRICAL CONTRACTORS FOR CONDUITS, PIPE SLEEVES, ETC. TO BE EMBEDDED IN CONCRETE.
4. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ADEQUATE SHEETINGS AND BRACINGS OF THE STRUCTURE FOR ALL LOADS THAT MAYBE IMPOSED DURING CONSTRUCTION.

B. CONCRETE & REINFORCEMENT

1. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM WITH THE LATEST BUILDING CODE OF AMERICAN CONCRETE INSTITUTE (ACI-318).
2. ALL CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH AT THE END OF TWENTY EIGHT (28) DAYS WITH CORRESPONDING MAXIMUM SIZE AGGREGATE AND SLUMPS AS FOLLOWS :

LOCATION	28 DAYS STRENGTH	MAX. SIZE AGGREGATE	MAX. SLUMP
CURBS & SLAB ON GRADE	3000 PSI	1 IN. (25MM.)	4 IN. (100MM.)
FOUNDATION & RETAINING WALL	3000 PSI	3/4 IN. (19MM.)	4 IN. (100MM.)
COLUMN/SHEARWALL	3000 PSI	3/4 IN. (19MM.)	4 IN. (100MM.)
BEAMS & SLABS	3000 PSI	3/4 IN. (19MM.)	4 IN. (100MM.)

3. ALL REINFORCING BARS SHALL CONFORM TO ASTM A615 GRADE 60 FOR DIA. 25 AND LARGER BARS AND GRADE 40 FOR DIA. 20 AND SMALLER BARS.
4. IN GENERAL, THE LATEST EDITION OF ACI-315, MANUAL OF STANDARD PRACTICE DETAILING REINFORCED CONCRETE STRUCTURES SHALL BE ADHERED TO, UNLESS OTHERWISE SHOWN OR NOTED.
5. MAINTAIN MINIMUM CONCRETE COVER FOR REINFORCING STEEL AS FOLLOWS:

SUSPENDED SLABS	3/4 IN. (19 MM.)
SLAB ON GRADE	1 1/2 IN. (38 MM.)
WALLS ABOVE GRADE	1 IN. (25 MM.)
BEAM STIRRUPS AND COLUMN TIES	1 1/2 IN. (38 MM.)
WHERE CONCRETE IS EXPOSED TO EARTH BUT POURED AGAINST FORMS	2 IN. (50 MM.)
WHERE CONCRETE IS DEPOSITED DIRECTLY AGAINST EARTH	3 IN. (75 MM.)

6. SPLICES SHALL BE SECURELY WIRED TOGETHER AND SHALL LAP OR EXTEND IN ACCORDANCE WITH TABLE 1 (TABLE OF LAP SPLICE AND ANCHORAGE LENGTH) UNLESS OTHERWISE SHOWN ON DRAWINGS, SPLICES SHALL BE STAGGERED WHENEVER POSSIBLE.
7. ALL ANCHOR BOLTS, BOWELS, AND OTHER INSERTS, SHALL BE PROPERLY POSITIONED AND SECURED IN PLACE PRIOR TO PLACING OF CONCRETE.
8. CONTRACTOR SHALL NOTE AND PROVIDE ALL MISCELLANEOUS CURBS, SILLS, STOOLS, EQUIPMENTS, AND MECHANICAL BASES THAT ARE REQUIRED BY THE ARCHITECTURAL, ELECTRICAL, AND MECHANICAL DRAWINGS.
9. ALL CONCRETE SHALL BE KEPT MOIST FOR A MINIMUM OF SEVEN (7) CONSECUTIVE DAYS IMMEDIATELY AFTER POURING BY THE USE OF WET BURLAP, FOG SPRAYING, CURING COMPOUNDS OR OTHER APPROVED METHODS.
10. STRIPPING OF FORMS AND SHORES:

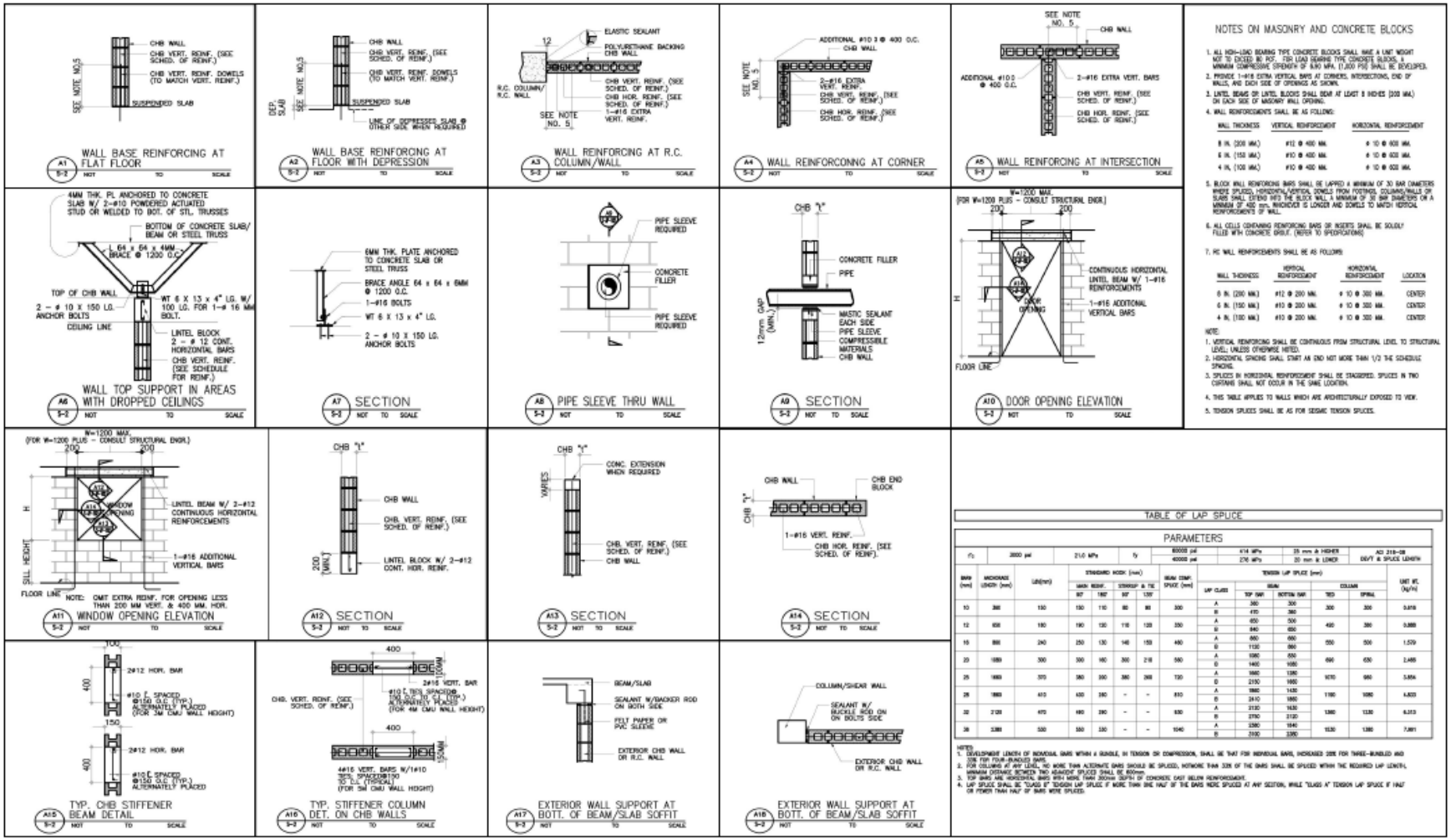
FOUNDATION	24 HRS.
SUSPENDED SLAB EXCEPT WHEN ADDITIONAL LOADS ARE IMPOSED	8 DAYS
WALLS	18 HRS.
BEAMS	14 DAYS

C. CAMBER REQUIREMENTS

1. UNLESS OTHERWISE NOTED ON THE PLANS OR SPECIFICATIONS CAMBER ALL RC BEAMS AT LEAST 12mm. FOR EVERY 4000mm. OF CLEAR SPAN EXCEPT CANTILEVERS WHICH SHALL BE 50mm. FOR EVERY 5800mm. OF CLEAR SPAN.
2. UNLESS OTHERWISE NOTED IN PLANS OR SPECIFICATIONS, CAMBER ALL SLABS 8mm PER 3000mm. OF SHORTER SPAN AND 14mm. FOR EVERY 3000mm. OF SLABS CANTILEVER SPAN

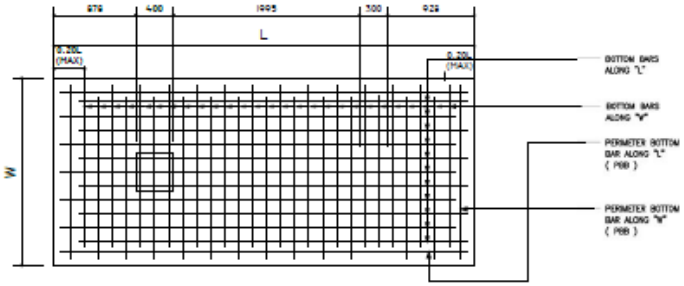
D. FOUNDATION

1. NO GEOTECHNICAL ASSESSMENT REPORT IS AVAILABLE. FOUNDATION IS DESIGNED BASED ASSUMED VALUE OF (150 KPa) AT 1.8m DEPTH.
2. FOUNDATION SHALL REST ON NATURAL SOIL, UNLESS OTHERWISE NOTED BY THE ENGINEER, NO PART OF THE FOUNDATION SHALL REST ON FILL.
3. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AFTER FOOTING EXCAVATION HAVE BEEN COMPLETED AND PRIOR TO CONCRETING TO CONFIRM THE DESIGN SOIL BEARING CAPACITY.



MISCELLANEOUS DETAILS AND MASONRY DETAILS

NOTE:
ANY DESCRIPANCY MUST BE VERIFIED WITH ARCHITECT AND ENGINEER

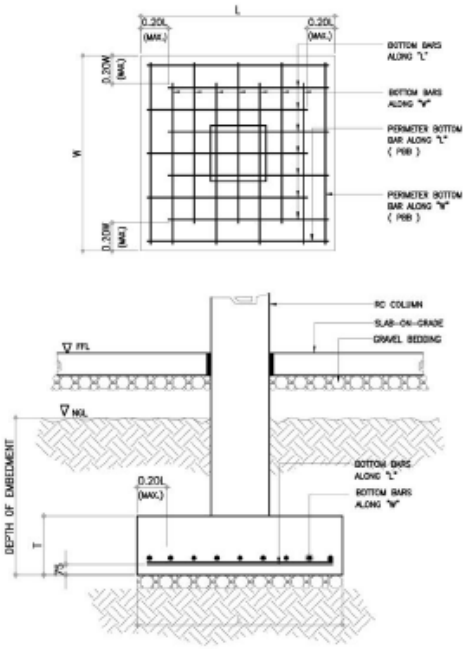


DETAIL OF COMBINED FOOTING
NOT TO SCALE

f'c=3000Psi fy=40Ksi

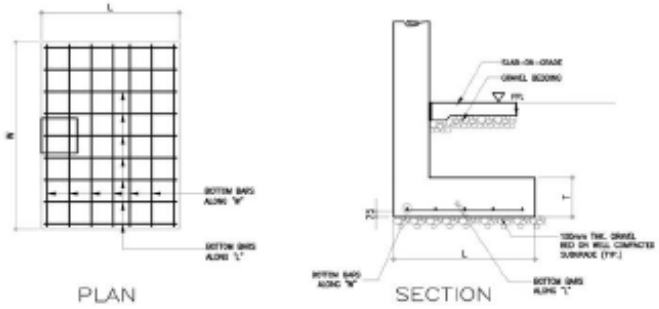
SCHEDULE OF REINFORCED CONCRETE FOOTING TIE BEAMS

FLOOR LEVEL LOCATION	BEAM MARK	SECTION		BAR ø		LONGITUDINAL REINFORCEMENTS					WEB BARS EACH FACE	STIRRUPS NO./SET	STIRRUPS ø	STIRRUP SPACING	REMARKS
		WIDTH	DEPTH			DISCONT. 'A'	CONT. 'A'	MIDSPAN	CONT. 'B'	DISCONT. 'B'					
	FTB-1	250	450	16	TB	9		5		9		1	ø10	1@50; 12@100; REST @300 TO C.L.	
					BB	5		5		5					



DETAIL OF ISLOATED FOOTING
NOT TO SCALE

f'c=3000Psi fy=40Ksi



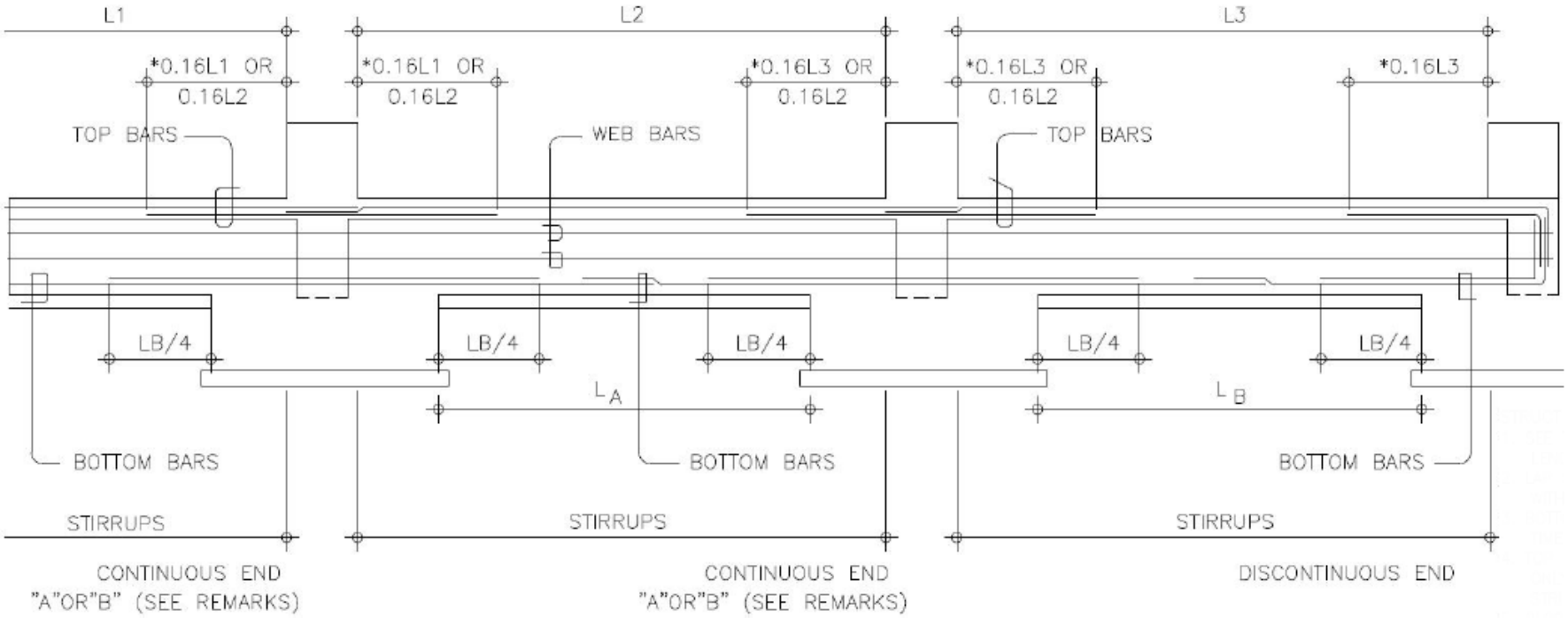
DETAIL OF CANTILEVER FOOTING
NOT TO SCALE

f'c=3000Psi fy=40Ksi

SCHEDULE OF FOOTING

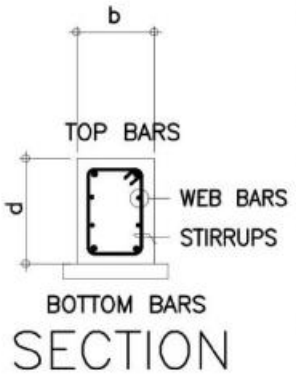
MARK	DIMENSION (mm.)			BOTTOM BARS		DEPTH OF EMBEDMENT (MM)	REMARKS
	L	W	T	ALONG "L"	ALONG "W"		
F-1	4500	2000	350	14 - ø20	14 - ø20	1800 (MIN.)	COMBINED/CANTILEVER
F-2	2200	2000	300	9 - ø20	9 - ø20	1800 (MIN.)	ISOLATED/CANTILEVER
F-3	1200	1200	300	5 - ø16	5 - ø16	1800 (MIN.)	ISOLATED

THE CONTRACTOR SHALL NOTIFY THE ENGINEER AFTER FOOTING EXCAVATION HAVE BEEN COMPLETED TO CONFIRM THE DESIGN SOIL BEARING CAPACITY.FOOTING & COLUMN TO BE ADJUSTED UPON CONFIRMATION OF THE ACTUAL SOIL BEARING CAPACITY.



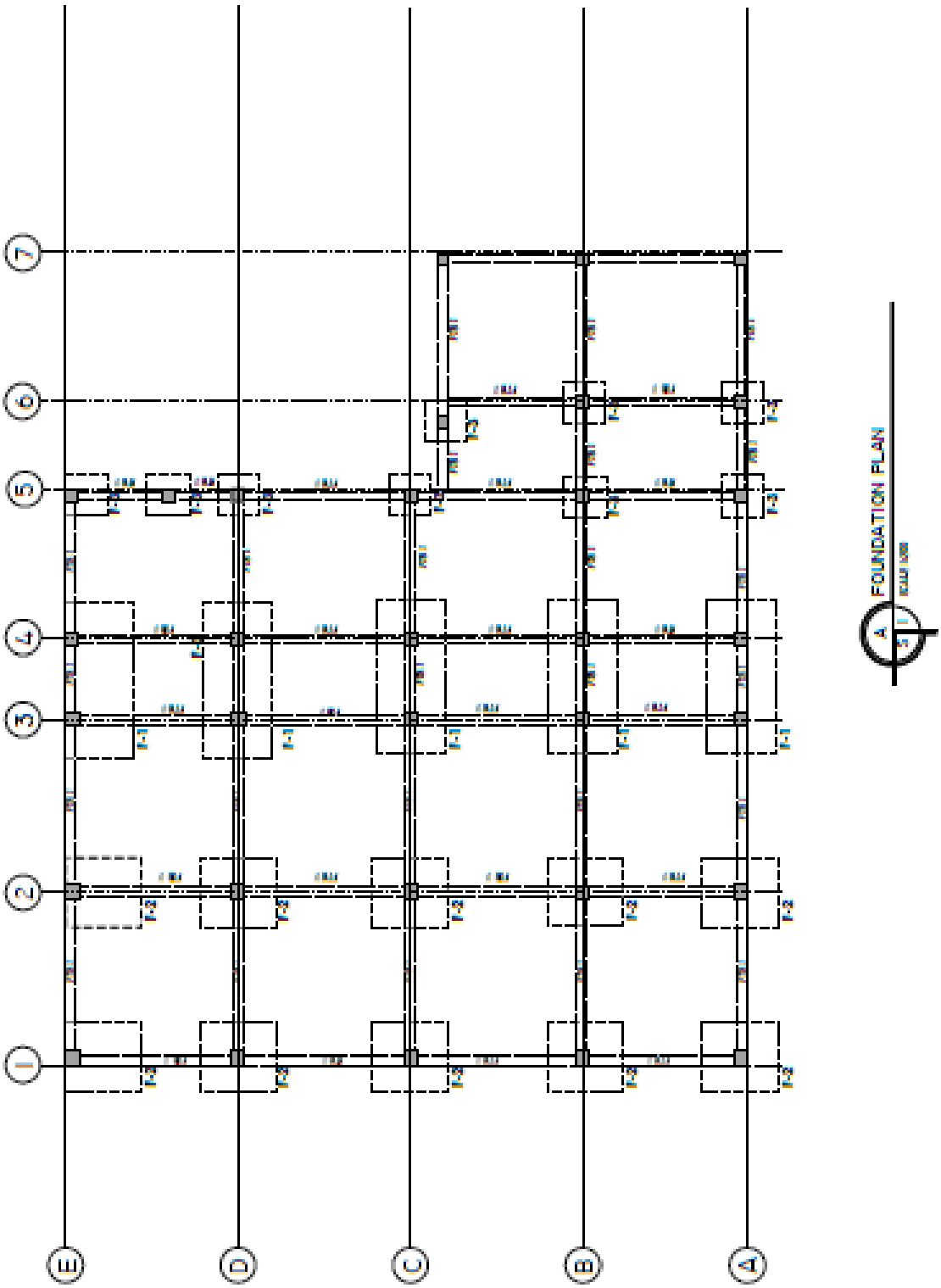
NOTE:
1. fy = 60000 ksi
2. MINIMUM BEAM DEPTH IS BASED ON HOOK EXTENSION LENGTH AND REQUIRED CONCRETE COVER

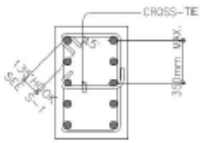
D TYPICAL FOOTING TIE BEAM ELEVATION
S1 NOT TO SCALE

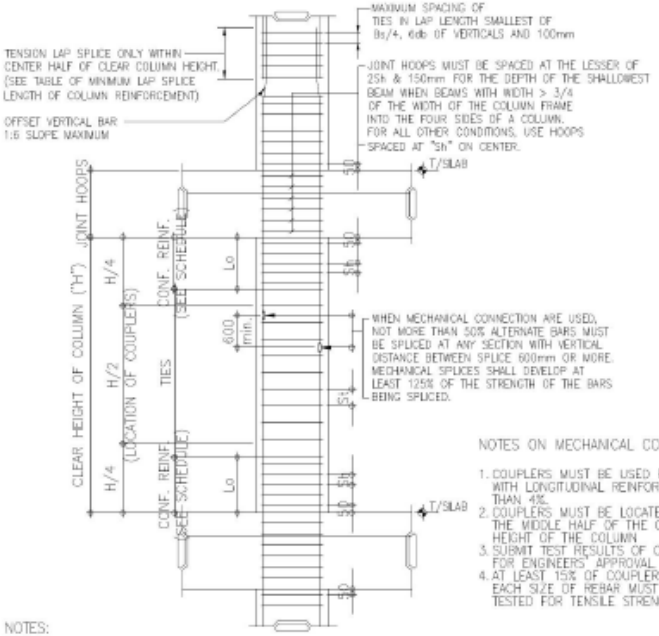


SECTION

STRUCTURAL NOTES :
1. SEE TABLE OF LAP SPLICE & ANCHORAGE LENGTHS SHOWN ON SHEET S-1.
2. LAP SPLICE SHALL BE LOCATED ONLY WITHIN THE LAP SPLICE ZONE.
3. BOTTOM BAR LAP SPLICE SHALL BE 1.30 TIMES THE LAP SPLICE REQUIREMENT.
4. TOP & BOTTOM BARS MAY BE LAP ONLY SPLICED ONE LOCATION FOR EACH STRING OF BEAMS.
5. CLOSED HOOPS WITH A 135° BEND SHALL BE SPACED AT 100 O.C. MAXIMUM AT A DISTANCE 2D FROM THE FACE OF THE SUPPORT. FIRST STIRRUP SHALL 5D FROM THE FACE OF THE SUPPORT.
6. CLOSED HOOPS SHALL BE PROVIDED WITHIN THE LAP SPLICE LENGTH AT 100 O.C. MAXIMUM SPACING.


FOUNDATION PLAN
A
S-1
SCALE: 1/8"=1'-0"





NOTES ON MECHANICAL COUPLERS:

1. COUPLERS MUST BE USED FOR COLUMNS WITH LONGITUDINAL REINFORCING GREATER THAN 4%.
2. COUPLERS MUST BE LOCATED WITHIN THE MIDDLE HALF OF THE CLEAR HEIGHT OF THE COLUMN.
3. SUBMIT TEST RESULTS OF COUPLERS FOR ENGINEERS' APPROVAL.
4. AT LEAST 15% OF COUPLERS FOR EACH SIZE OF REBAR MUST BE TESTED FOR TENSILE STRENGTH TEST

NOTES:

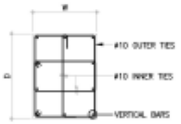
Sh = HOOP AND SUPPLEMENTARY CROSSTIE SPACING NOT TO EXCEED SMALLEST Bs/4, 6db OF VERTICALS AND 100mm.
St = COLUMN TIE SPACING, NOT TO EXCEED 8db OF VERTICALS, 48db OF TIES, Bs OR 150mm, WHICHEVER IS LESSER.
Bs = SMALLER DIMENSION OF COLUMN CROSS SECTION.
Lo = LARGEST COLUMN DIMENSION, 1/6 OF CLEAR HEIGHT OR 450mm, WHICHEVER IS GREATER.
H = CLEAR HEIGHT OF COLUMN.

A — TYPICAL MOMENT FRAME COL. CONCRETE SPLICE DETAIL

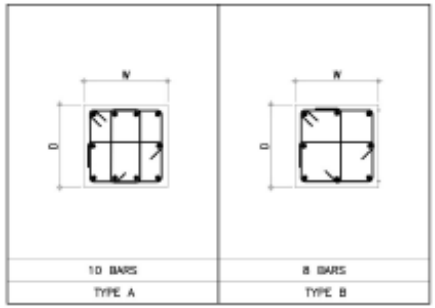
f'c=3000Psi fy=40Ksi

SCHEDULE OF REINFORCED CONCRETE COLUMNS

fc'	FLOOR LEVEL	MARK	C-1	C-2
3,000 PSI	FOUNDATION ROOF LEVEL	SIZE (WxD)	400 X 400	300 x 300
		VERTICAL BARS	4 - #20	4 - #20
		TIES/SPIRAL	3-#10@100	3-#10@100
		CONF. REINF.	3-#10@100	3-#10@100
		JOINT REINF.	3-#10@100	3-#10@100
		TYPE	A	B



B — DETAIL OF COMBINATION TIES

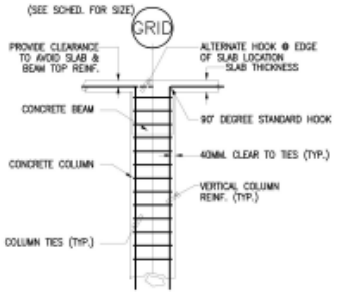


C — COLUMN TYPES

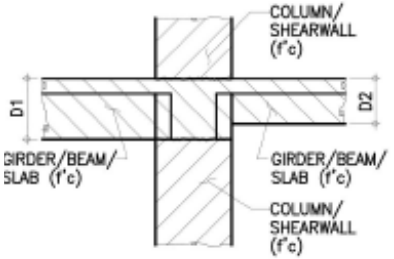
CONCRETE COLUMN PROFILE/W=WIDTH,D=DEPTH	SIZE (W X D)	SIZE OF COLUMNS
NUMBER & SIZE OF VERTICAL BARS REQUIRED	VERTICAL BARS	
NOTE: ALL BARS TO BE UNIFORMLY DISTRIBUTED AT PERIMETER	TYPE	TYPE OF REINFORCING LAYOUT
TYPE IS THE VERTICAL LAYOUT W/ NUMBER OF TIES & CONFIGURATION	SPIRAL/TIES	VERTICAL SPACING OF TIE HOOP REINF.
CONFINEMENT REINFORCING BAR FOR (SMRF) ABOVE & BELOW COLUMN JOINTS	COLUMN HOOPS	SIZE OF HOOPS REQUIRED
JOINT HOOPS REINFORCING FOR (SMRF) ABOVE & BELOW COLUMN JOINTS	JOINT HOOPS	

NOTE:

THE CONTRACTOR SHALL NOTIFY THE ENGINEER AFTER FOOTING EXCAVATION HAS BEEN COMPLETED, TO CONFIRM THE DESIGN SOIL BEARING CAPACITY. FOOTING AND COLUMN TO BE ADJUSTED UPON CONFIRMATION OF THE ACTUAL SOIL BEARING CAPACITY.



D — TYP. GRAVITY TOP OF CONCRETE COL. DETAIL

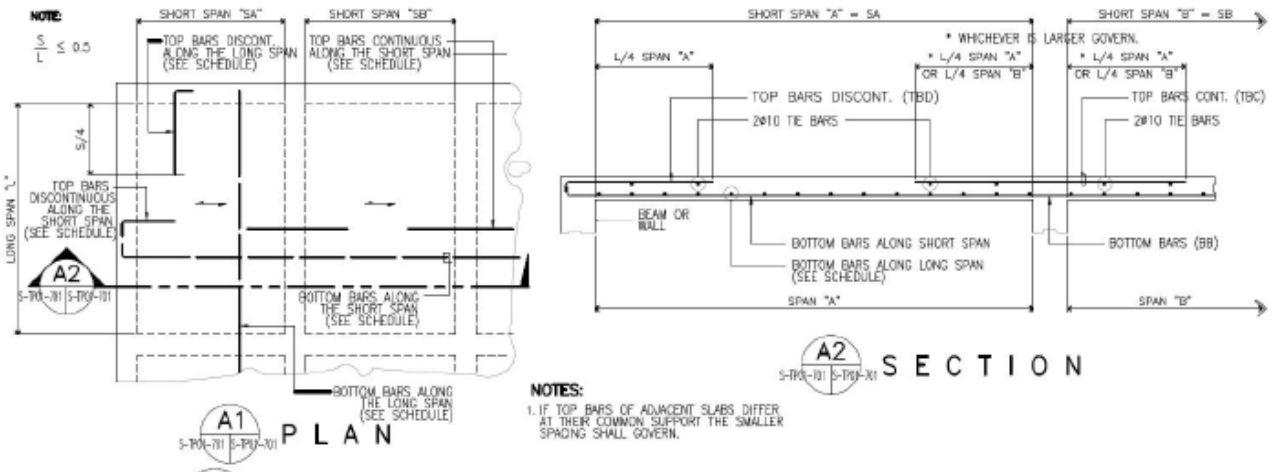


COLUMN/SHEARWALL (f'c)	GIRDER/BEAM/SLAB (f'c)
3,000 psi	3,000 psi

DIAGRAMATIC SKETCH SHOWING CONSTRUCTION JT. AND TERMINATION OF CONCRETE STRENGTH OF BEAM, GIRDER, COL., SHEARWALL AND SLAB

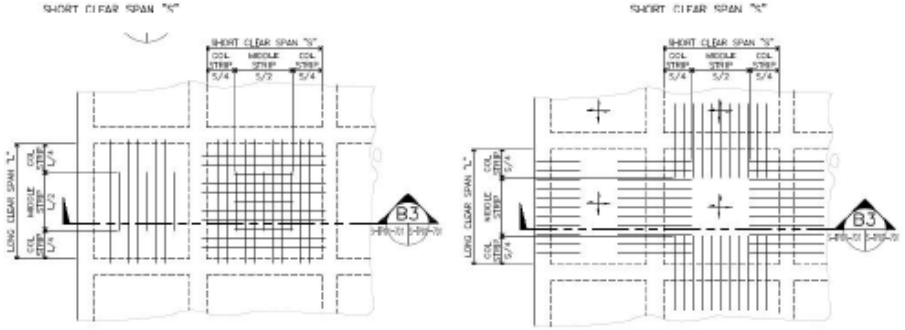
E

NOTE:
ANY DESCRIPANCY MUST BE VERIFIED WITH ARCHITECT AND ENGINEER



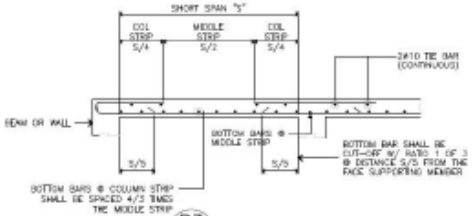
A TYPICAL ONE-WAY REINFORCED CONCRETE SLAB DETAIL

SCALE : NOT TO SCALE



B1 TYP. FRAMING PLAN OF TWO-WAY SHOWING BOTTOM BAR REINF.

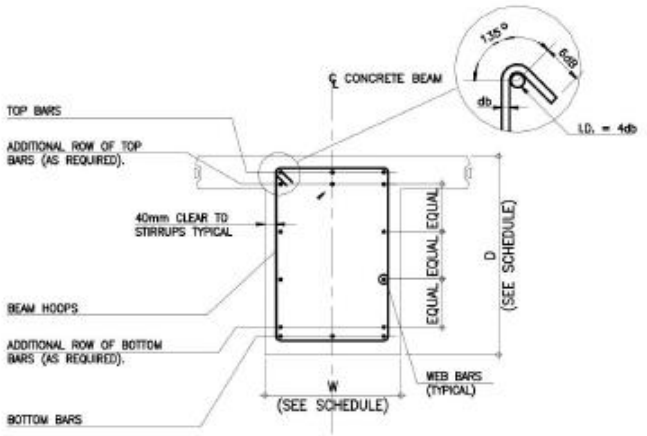
B2 TYP. FRAMING PLAN OF TWO-WAY SHOWING TOP BAR REINF.



B3 SECTION

B TYPICAL TWO-WAY REINFORCED CONCRETE SLAB DETAIL

SCALE : NOT TO SCALE

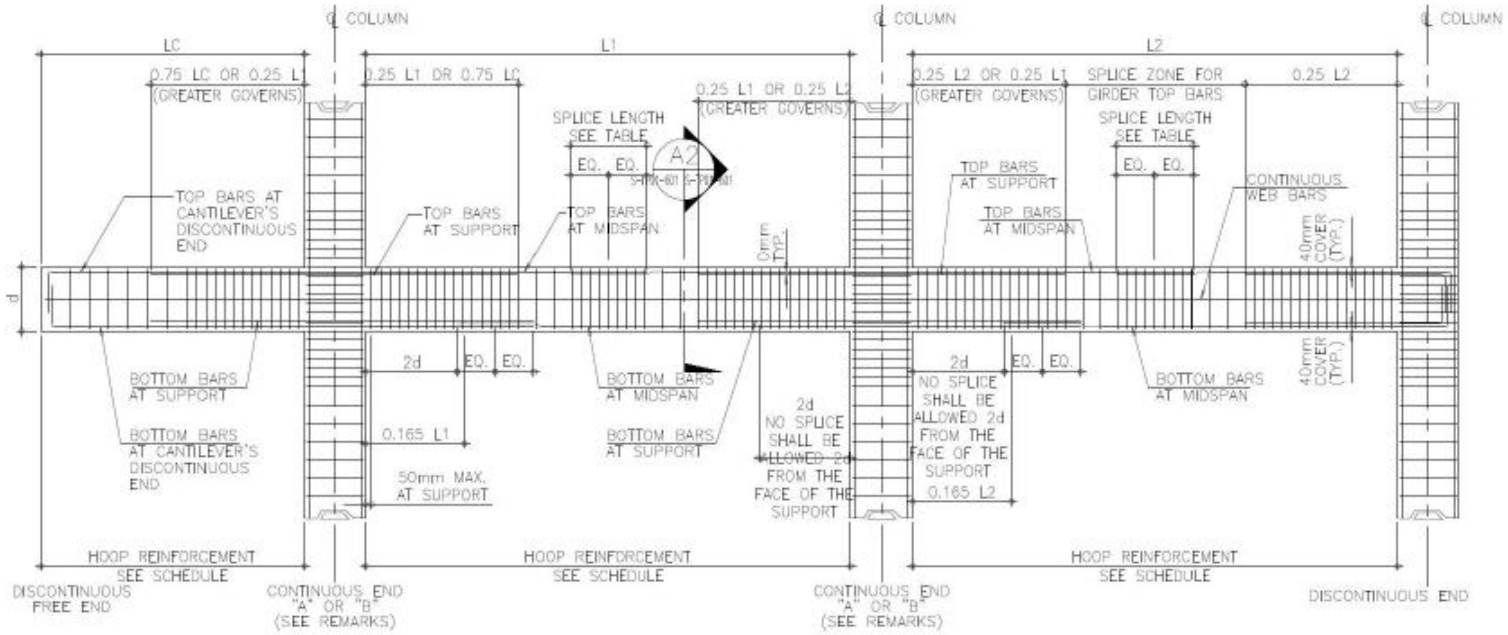


NOTE: SLAB REINFORCEMENT NOT SHOWN FOR CLARITY

SECTION

STRUCTURAL NOTES :

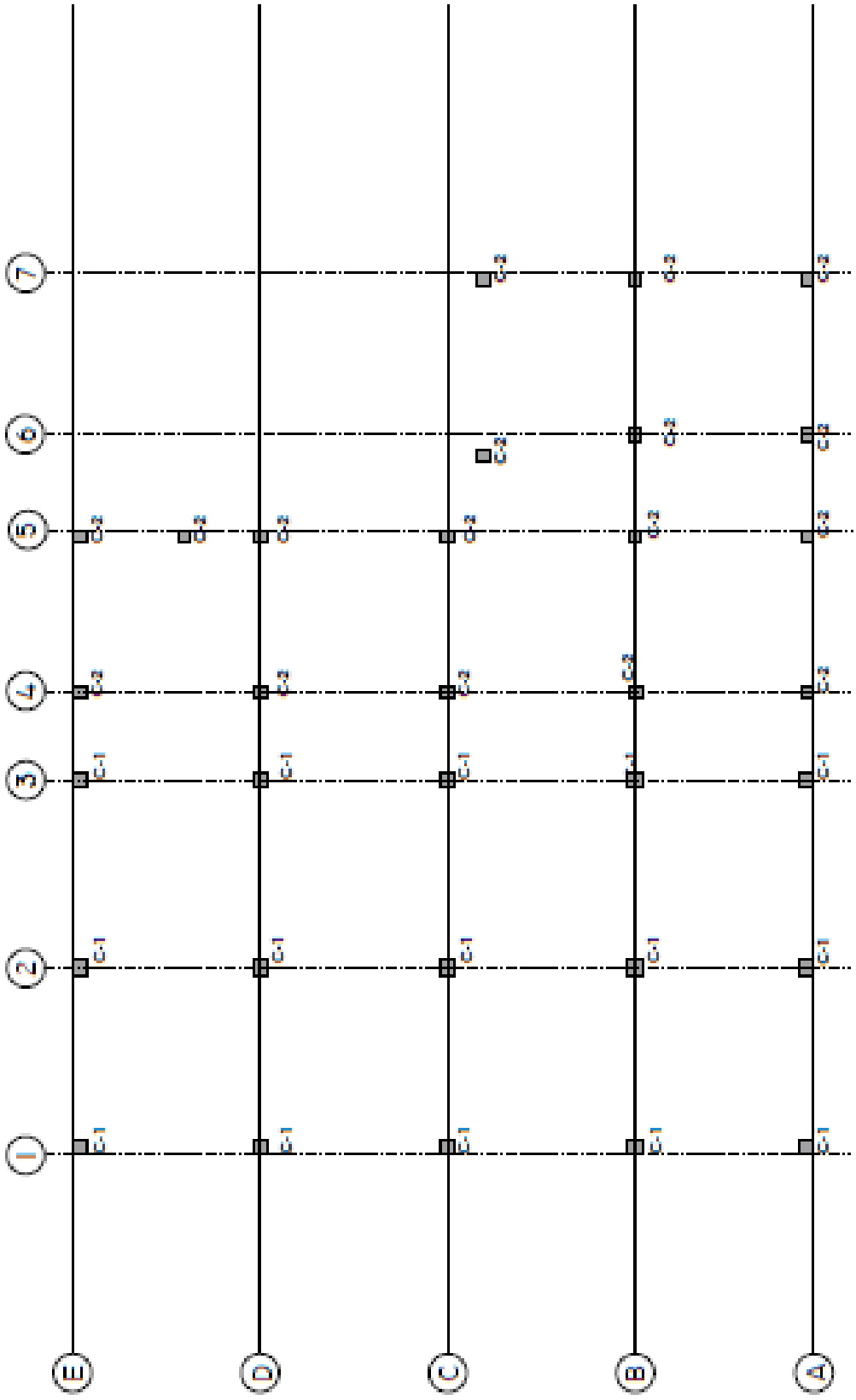
1. SEE TABLE OF LAP SPLICE & ANCHORAGE LENGTHS SHOWN ON SHEET
2. LAP SPLICE SHALL BE LOCATED ONLY WITHIN THE LAP SPLICE ZONE.
3. TOP & BOTTOM BARS MAY BE LAP SPLICED ONLY ON ONE LOCATION FOR EACH STRING OF BEAMS.
4. CLOSED HOOPS WITH A 135° BEND SHALL BE SPACED AT 100 O.C. MAXIMUM AT A DISTANCE 2D FROM THE FACE OF THE SUPPORT. FIRST STIRRUP SHALL 5D FROM THE FACE OF THE SUPPORT.

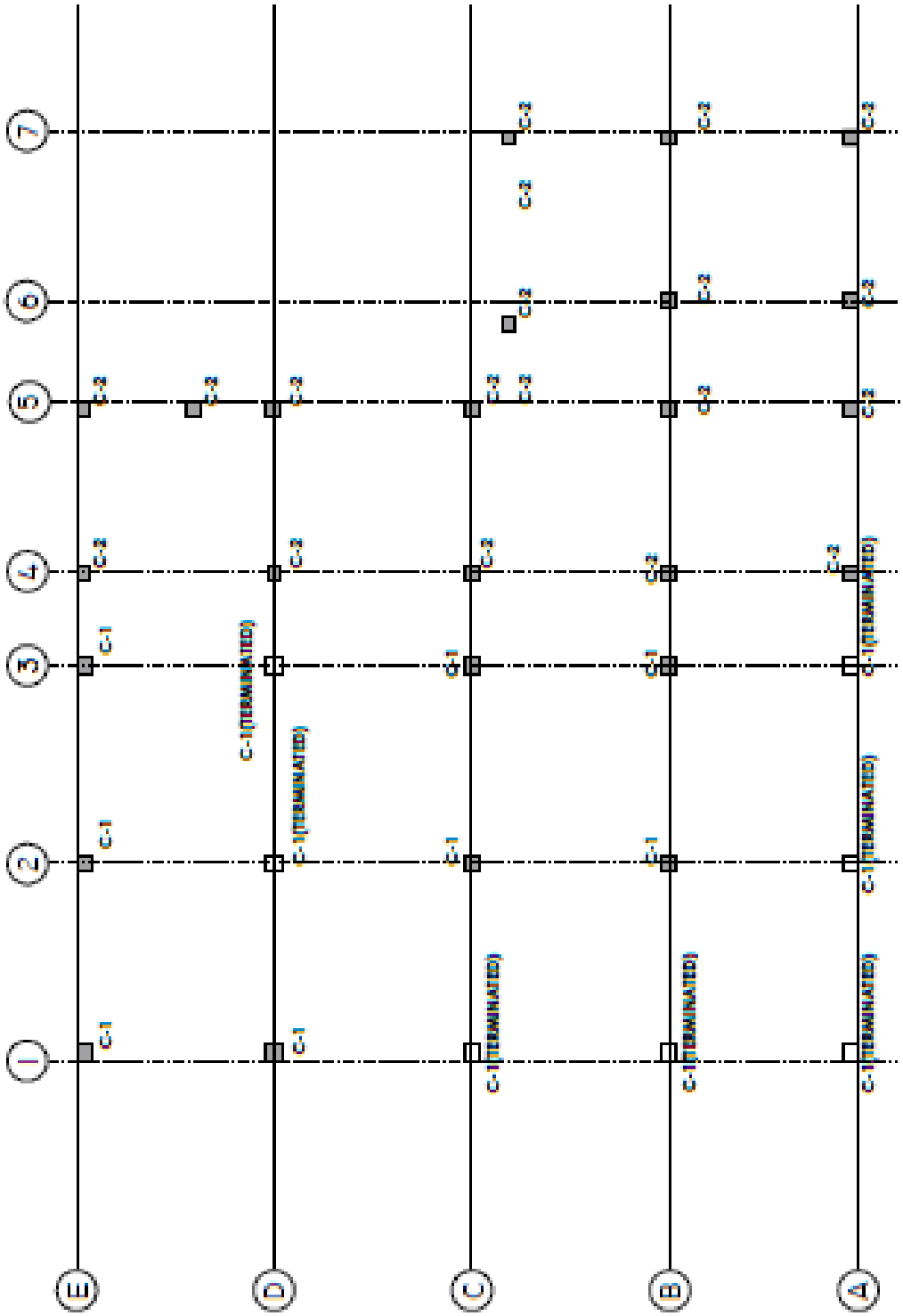


NOTE: 1. AT INTERIOR SUPPORT (CONTINUOUS END) PROVIDE LARGER SIZE AND NUMBER OF TOP AND BOTTOM BARS FROM ADJACENT SPAN.

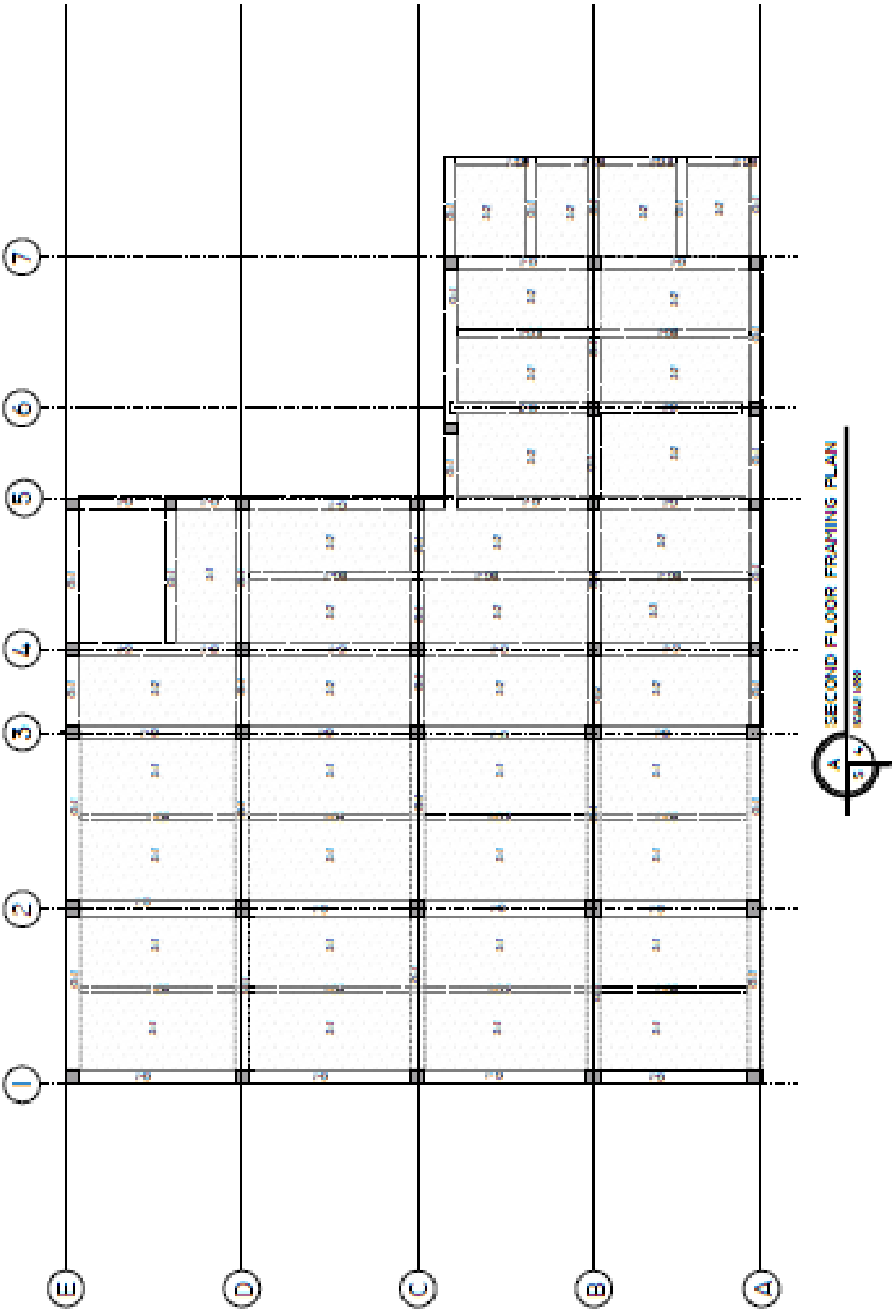
2. SPACING OF THE TRANSVERSE REINFORCEMENT ENCLOSING THE LAP-SPLICED BAR SHALL NOT EXCEED TO 100mm.

DUCTILE MOMENT FRAME BEAM DETAIL


1
2
3
4
5
6
7
A
B
C
D
E
C-1
C-2
COLUMNATION PLAN (GROUND)



COLUMNATION PLAN (SECOND)


SECOND FLOOR FRAMING PLAN
1
2
3
4
5
6
7
A
B
C
D
E

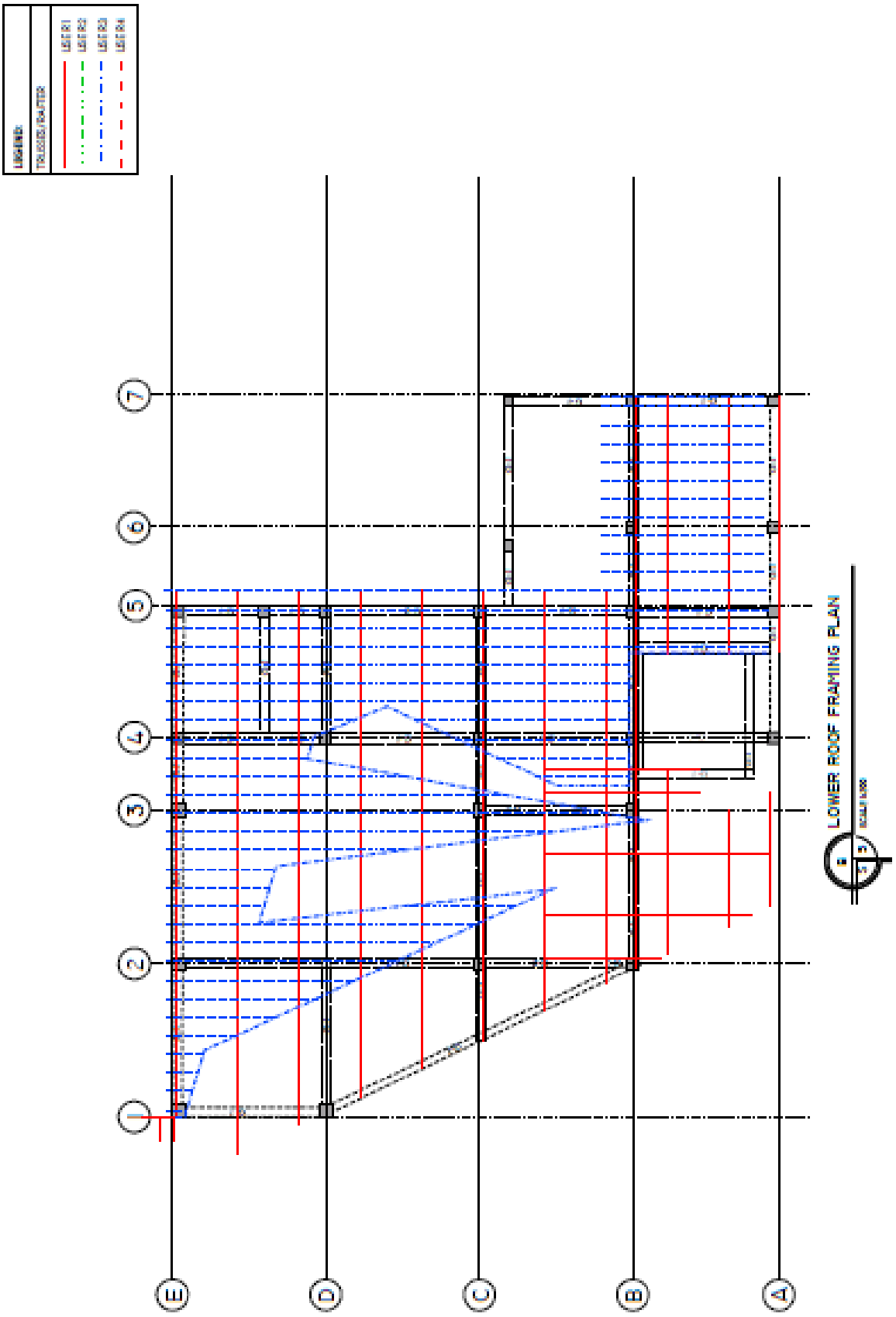
SCHEDULE OF SLAB REINFORCEMENT

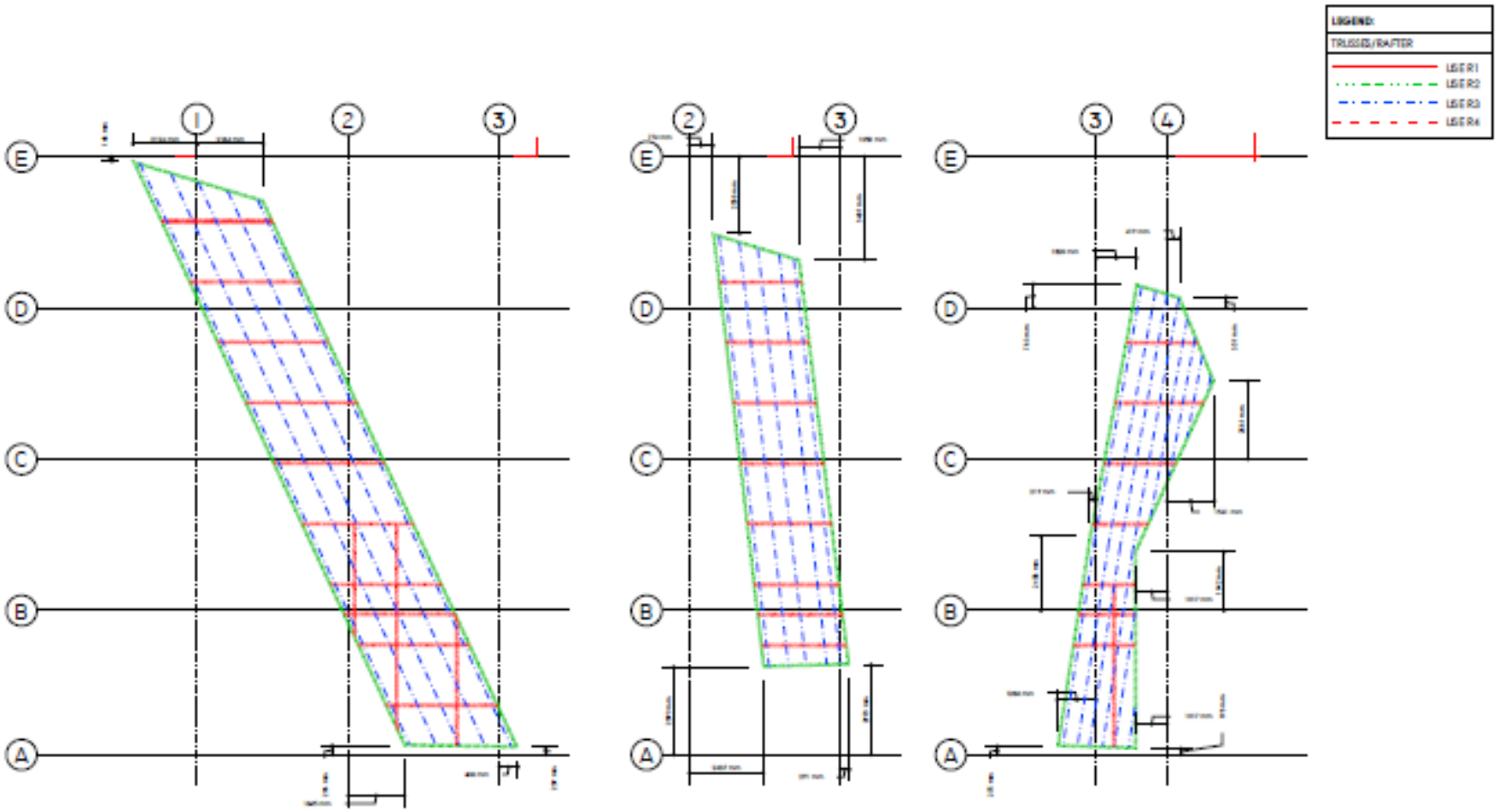
FLOOR LEVEL LOCATION	SLAB MARK	THICKNESS (t)	BAR ø UNLESS OTHERWISE SPECIFIED	SHORT SPAN (mm)			LONG SPAN SPAN (mm)			REMARKS A–ONE WAY SLAB B–TWO WAY SLAB C–CANTIL. SLAB
				TOP BARS DISCONT. (TBD)	BOTTOM BARS (BB)	TOP BARS CONT.(TBC)	TOP BARS DISCONT. (TBD)	BOTTOM BARS (BB)	TOP BARS CONT.(TBC)	
	S-1	150	10	–	275	150	–	275	275	B
	S-2	150	10	–	200	125	250	250	250	A

f'c=3000Psi fy=40Ksi

SCHEDULE OF CONCRETE GIRDERS

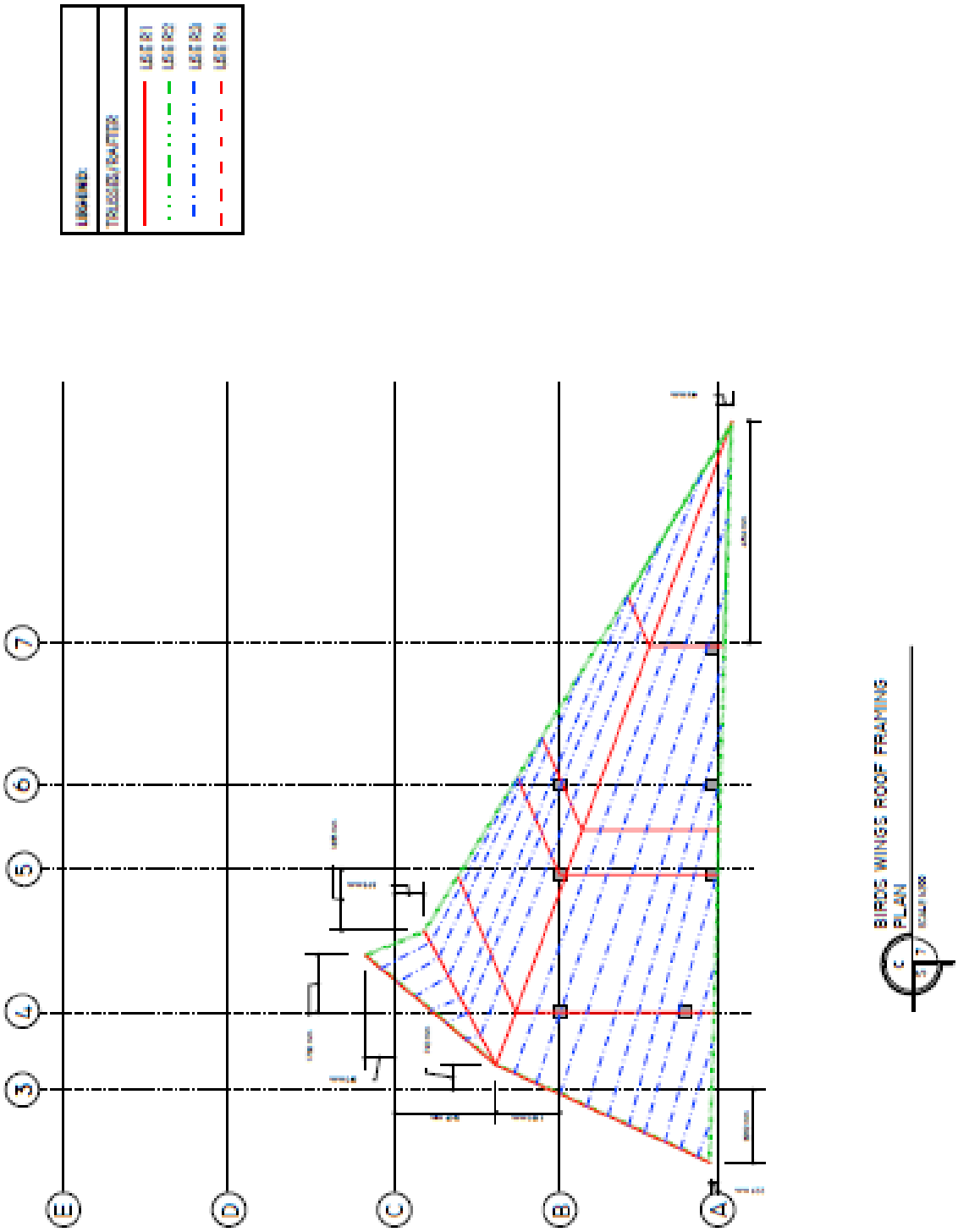
FLOOR LEVEL LOCATION	BEAM MARK	BEAM SECTION		BAR ø		LONGITUDINAL REINFORCEMENTS					MEB BARS EACH FACE	STIRRUPS NO./SET	STIRRUPS ø	STIRRUP SPACING	REMARKS
		WIDTH (W)	DEPTH (D)			DISCONT. 'A'	CONT. 'A'	MIDSPAN	CONT. 'B'	DISCONT. 'B'					
	G–1	300	400	20	TB	5		3	5		–	1	10	1@50; 10@100; REST@250 TO C.L.	
					BB	3		3	3						
	BG-1	300	400	16	TB	4		3	4		-	1	10	2@50; 8@100; REST @250 TO C.L.	
					BB	3		4	3						

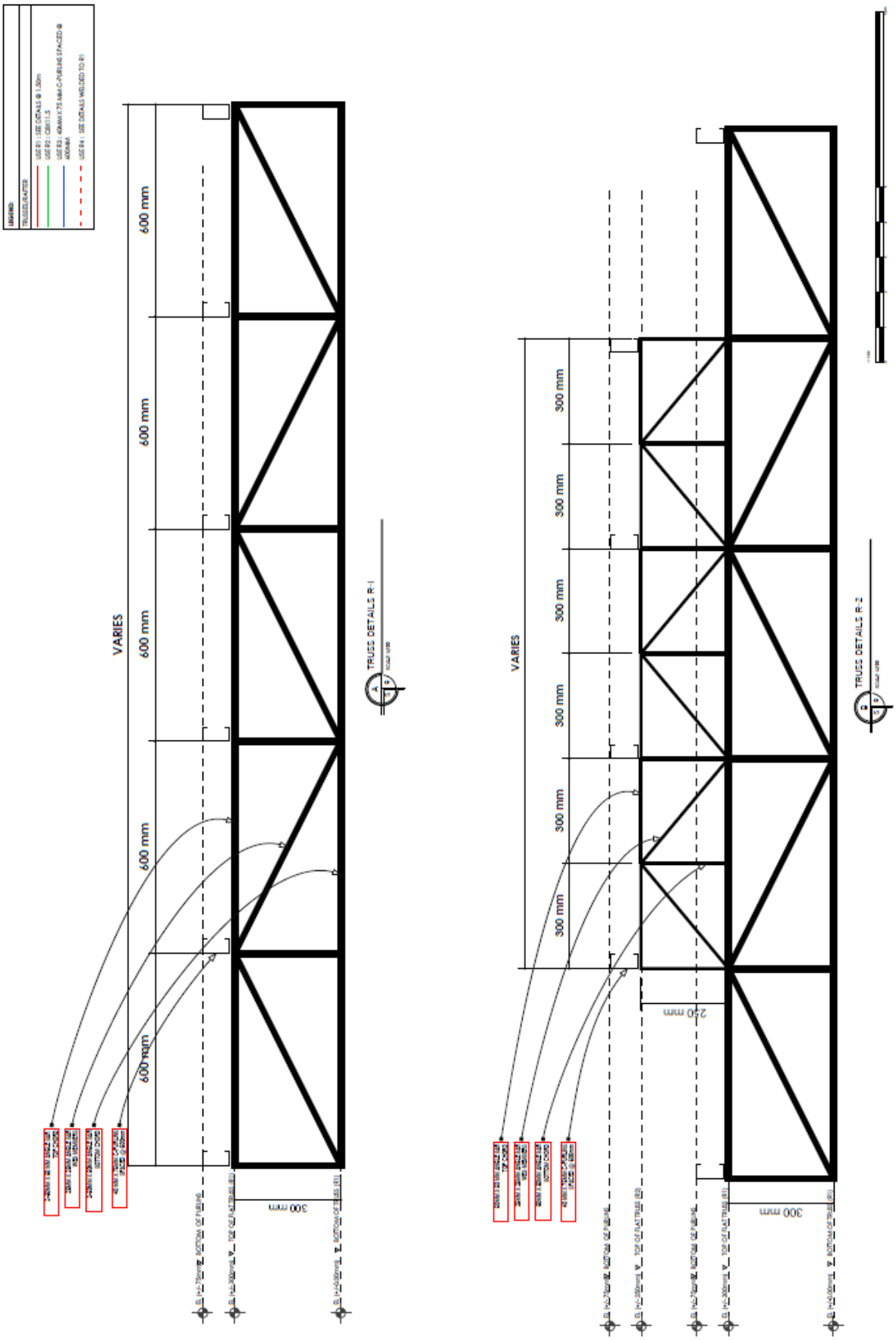

LEGEND:
TRUSSES / RAFTERS
LEVEL 1
LEVEL 2
LEVEL 3
LEVEL 4
7
6
5
4
3
2
1
E
D
C
B
A
LOWER ROOF FRAMING PLAN



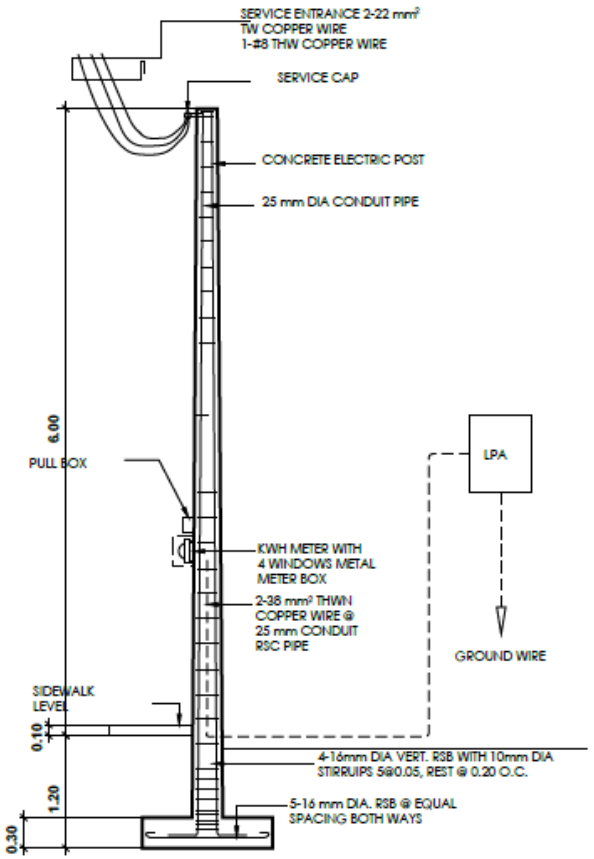
NOTE:
ANY DISCREPANCY MUST BE VERIFIED WITH ARCHITECT AND ENGINEER

BIRDS WINGS ROOF FRAMING PLAN

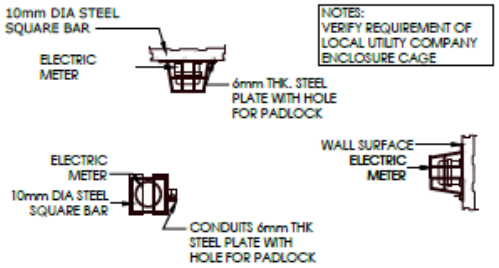

LOADING:
TRUSSES/RAFTERS
LOS 01
LOS 02
LOS 03
LOS 04
7
6
5
4
3
E
D
C
B
A
BIRDS WINGS ROOF FRAMING
PLAN


VARIES
600 mm
600 mm
600 mm
600 mm
600 mm
300 mm
TRUSS DETAILS R-1
VARIES
300 mm
300 mm
300 mm
300 mm
300 mm
250 mm
300 mm
TRUSS DETAILS R-2

ELECTRICAL PLANS



	GROUND WIRE
	POWER SERVICE ENTRANCE CAP
	KILOWATT-HOUR METER MOUNTED ON WALL 1.7 M ABOVE GROUND
	LIGHTING AND POWER PANEL BOARD MOUNTED 1.7 M FROM TOP OF PANEL TO FINISHED FLOOR LINE; BOLT ON CIRCUIT BREAKER
	CIRCUIT BREAKER
CKT	CIRCUIT HOMERUN (NUMBER INDICATED CIRCUIT NO.)
	DUPLEX CONVENIENCE OUTLET 15A, 220V MOUNTED 300mm ABOVE FINISH FLOOR LINE
WP	WATERPROOF DUPLEX CONVENIENCE OUTLET 15A, 220V MOUNTED 300mm ABOVE FINISH FLOOR LINE
	RECESSED TYPE PIN LIGHT (DOWNLIGHT) DOWNLIGHT HORIZONTAL MOUNTING W/ PLC 2X26W/86 LAMP IP 55
	SURFACE MOUNTED INDUSTRIAL TYPE FLOURESCENT LAMP FIXTURE W/ 1-40W LAMP W/ ALUMINUM REFLECTOR
	LED LIGHTING (WALL MOUNTED)
S	ONE SINGLE SWITCH ON SINGLE GANG DEVICE COVER MOUNTED 0.97 M ABOVE FINISH FLOOR LINE
S2	TWO SINGLE POLE SWITCHES ON TWO DEVICE PLATE COVER, MOUNTED 1.37 M FINISH FLOOR LINE
S3	THREE SINGLE POLE SWITCHES ON THREE DEVICE PLATE COVER MOUNTED 1.37 M ABOVE FINISH FLOOR LINE
S3W	THREE-WAY SWITCHES ON SINGLE DEVICE PLATE COVER MOUNTED 1.37 M ABOVE FINISH FLOOR LINE
	LIGHTING OUTLET WIRING
	CONVENIENCE OUTLET WIRING
	SWITCH WIRE
	SWITCH



A. All electrical works and installations shall comply with
1. Latest edition of the Philippine Electrical Code (PEC/NEC)
2. Republic act 7920 otherwise known as the new Electrical engineering law
3. National Building Code
4. Fire Code Of The Philippines
5. Existing local utility company
6. Existing city/ municipality ordinances and
7. Requirements of the Bureau of Labor Standards

B. Electrical installation herein shall be done under the direct supervision of a duly registered electrical engineer. The electrical engineer shall be responsible in the interpretation of the design intent, plans and specifications and the required standard of the electrical code.

C. Materials and equipment to be used (ballast, Fluorescent tube, wiring devices, circuit breakers, conduit and pipes, enclosures, wires and cables, products and p.s. mark for local in nature of the Bureau of Product Standards (BPS).

D. Provide grounding and neutral wire to all outlets and lighting circuits. All non-current carrying metal parts shall be grounded and bonded etc...) shall have Imported commodity Clearance (ICC) label for foreign made.

E. All panel boards, main distribution panels, etc.. shall have grounding bus for branch circuits and sub-feeder grounding system, main grounding system shall be bonded to the nearest metal water pipe in service.
1. Lighting switches 1.4m above floor finish
2. Convenience outlet 0.3m above floor finish
3. Telephone outlet 0.3 m above floor finish
4. Panel boards and cabinets__1.8 m on top above floor finish
5. Motor control and ECB __1.8 m on top above floor finish

F. Mounting heights for all wiring devices and panel boards shall be as
6. Manual transfer switch 1.8 m on top above Floor finish
7. Emergency light fixture 0.3 m below ceiling line

G. Wiring method shall be as follows:
1. Service entrance riser Intermediate Metallic Conduit (imc)
2. Lighting and power system Electrical Metallic Tubing (emt)
3. Telephone system Electrical Metallic Tubing (emt)
4. All vibrating equipment liquidtight flexible conduit
5. Junction box to lighting fixture flexible metal conduit10mm.

H. Lighting fixtures with fluorescent tube shall have thermal protector high-power factor ballast.(pre-heat)

I. Mechanical equipment with high vibration movements shall have flexible conduit connection from motor terminal box to overcurrent device enclosure (ecb).

J. Prior to its mounting and termination of lighting fixtures, wiring devices, equipment, etc...

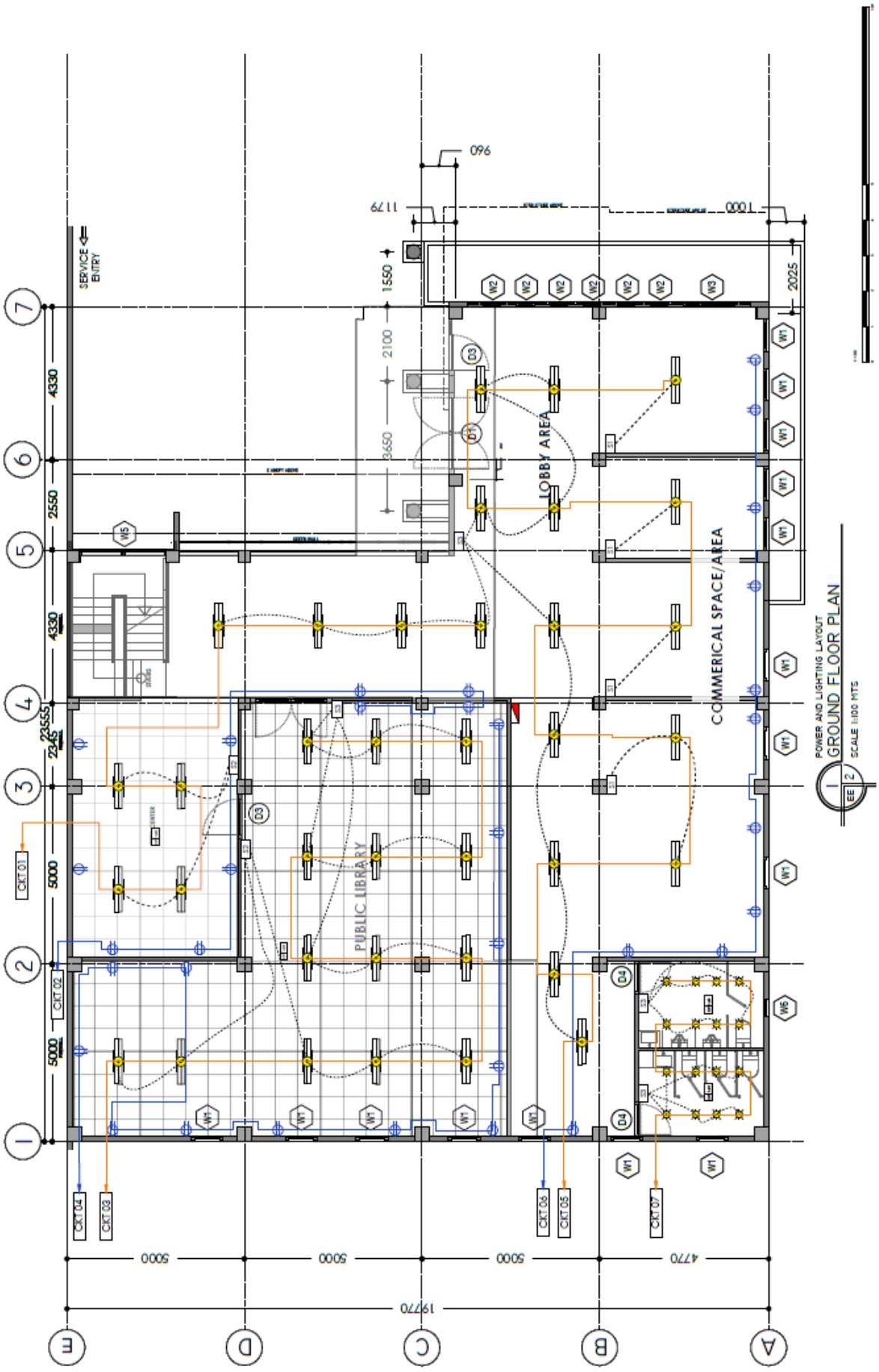
K. Contractor shall engage with the consultant Or owner representative the following field acceptance test and material inspection:
1. Branch circuits and sub-feeder insulation resistance test measurement
2. Polarity test on wiring devices
3. Ground resistance test measurement
4. Materials quality inspection as required in the above specification
5. Ground well resistance test measurement for lightning system

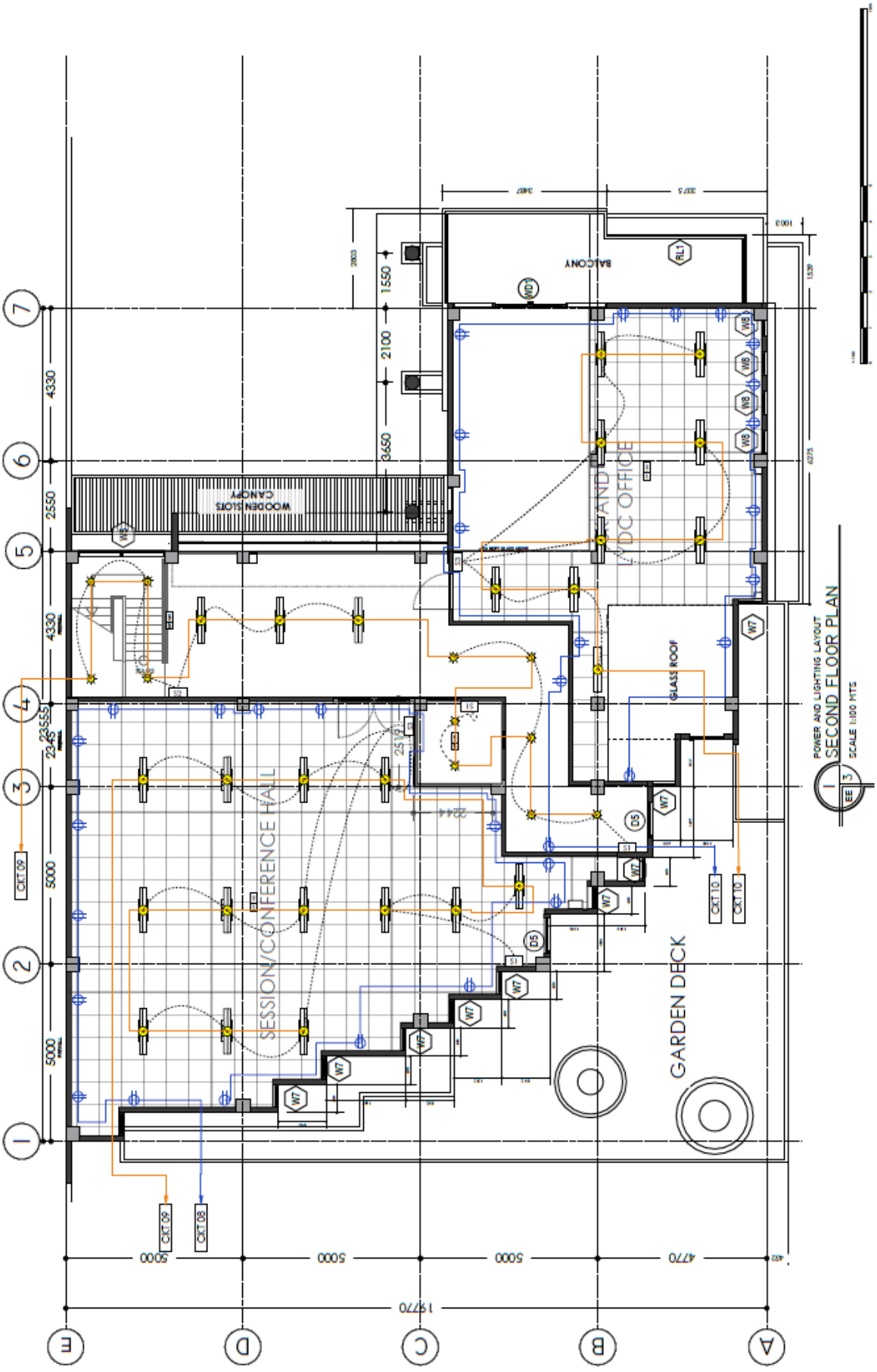
L. All works shall be executed in a workmanship manner and shall present present a neat and orderly acceptance. All wirings shall be concealed as much as possible.

1 EE 1 RISER DIAGRAM
SCALE 1:100 MTS

2 EE 1 METER CAGE DETAILS
SCALE 1:100 MTS

3 EE 1 ELECTRICAL NOTES
SCALE 1:100 MTS


SERVICE ENTRY
LOBBY AREA
COMMERICAL SPACE/AREA
PUBLIC LIBRARY
CKT 01
CKT 02
CKT 03
CKT 04
CKT 05
CKT 06
CKT 07
POWER AND LIGHTING LAYOUT
GROUND FLOOR PLAN
SCALE 1:100 MTS
19770
5000
4770

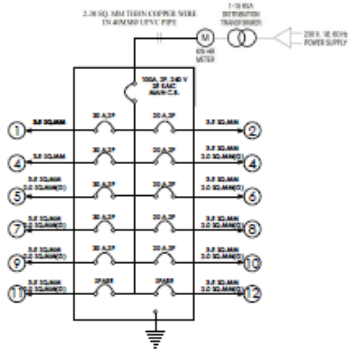

SESSION/CONFERENCE HALL
GARDEN DECK
BALCONY
WOODEN SLOTS CANOPY
GLASS ROOF
CKT 09
CKT 08
CKT 10
POWER AND LIGHTING LAYOUT
SECOND FLOOR PLAN
SCALE 1:100 MTS

CKT	LOAD DESCRIPTION	LO	S1	S2	S3	CO	VA	VOLTS	AMPS	PHASE	FREQ	CIRCUIT PROTECTION	KAIC	SIDE OF FEEDER WIRE	GROUND WIRE	CONDUIT SIZE uPVC
01		8		1	1		533.60	230	2.32	1	60	20 A,2P	10	2-2.0sqmm thhn		20mm dia
02						8	621.00	230	2.70	1	60	20 A,2P	10	2-2.0sqmm thhn		20mm dia
03		14		1	1		1113.20	230	4.84	1	60	20 A,2P	10	2-3.5sqmm thhn		20mm dia
04						12	540.50	230	2.35	1	60	20 A,2P	10	2-3.5sqmm thhn	1-2.0 sqmm	20mm dia
05		14					899.30	230	3.91	1	60	20 A,2P	10	2-2.0sqmm thhn	1-2.0 sqmm	20mm dia
06						11	1439.80	230	6.26	1	60	20 A,2P	10	2-2.0sqmm thhn	1-2.0 sqmm	20mm dia
07		16			2		1150	230	5.00	1	60	20 A,2P	10	2-2.0sqmm thhn	1-2.0 sqmm	20mm dia
08						16	1150	230	5.00	1	60	20 A,2P	10	2-2.0sqmm thhn	1-2.0 sqmm	20mm dia
09		27	3	1	1		1150	230	5.00	1	60	20 A,2P	10	2-2.0sqmm thhn	1-2.0 sqmm	20mm dia
10		9			1	16	1150	230	5.00	1	60	20 A,2P	10	2-2.0sqmm thhn	1-2.0 sqmm	20mm dia
							1150	230	5.00	1	60					
	TOTAL	32	5	4	3	16	9747.40		42.38							

USE:100 A, 2P, 240 V MAIN CIRCUITBREAKER, 25 KAIC, 2-30 SQ.MM THHN COPPER WIRE & 1 - 8.0 SQ.MM. TW (GROUND), IN 40 MM DIA. UPVC PIPE

1 EE 4 SCHEDULE OF LOADS

SCALE NTS



4 EE 4 SINGLE LINE DIAGRAM

SCALE NTS

		PHASE	SINGLE		FULL LOAD CUR	65.22 A								
		TRANSFROMER	15 KVA		% IMP	1.30%							FAULT AT TRANSFORMER	
		VOLTAGE	230 VOLTS		IMP @ 230 V	0.0458 OHMS							5016.72	A
FROM	TO	CIRCUIT PROTECTION	WIRE SIZE SQ.MM	LENGTH IN M (L)	RESISTANCE (R)	REACTANCE (XL)	IMPEDANCE (Z)	LOAD CURRENT (I)	VOLTAGE (V)	# WIRE/PHASE (N)	VOLTAGE DROP (VD)	VOLTAGE DROP (%VD)	VOLTAGE AT LOAD	SHORT CIRCUIT AT FAULT	KAIC RATING
SERVICE DROP	PB	100 AT, 2P	30.0	40	0.001	0.045	0.0270	42.38	230	1	2.29	1.00	227.71	3156.74	25
PB	C1	20 AT,2P	3.5	10	2.050	0.054	0.0671	2.32	230	1	2.60	1.13	227.40	1641.73	10
PB	C2	20 AT,2P	3.5	18	2.050	0.054	0.1210	2.70	230	1	2.94	1.28	227.06	1186.27	10
PB	C3	20 AP, 2P	3.5	22	2.050	0.054	0.1479	4.84	230	1	3.72	1.62	226.28	1041.76	10
PB	C4	20 AP, 2P	3.5	23	2.050	0.054	0.1546	2.35	230	1	3.02	1.31	226.98	1010.97	10
PB	C5	20 AT, 2P	3.5	26	2.050	0.054	0.1748	3.91	230	1	3.66	1.59	226.34	928.64	10
PB	C6	20 AT,2P	3.5	21	2.050	0.054	0.1412	6.26	230	1	4.06	1.76	225.94	1074.48	10
PB	C7	20 AT,2P	3.5	26	2.050	0.054	0.1748	3.91	230	1	3.66	1.59	226.34	1010.97	10
PB	C8	20 AT,2P	3.5	26	2.050	0.054	0.1748	3.91	230	1	3.66	1.59	226.34	1010.97	10
PB	C9	20 AT,2P	3.5	26	2.050	0.054	0.1748	3.91	230	1	3.66	1.59	226.34	1010.97	10
PB	C10	20 AT,2P	3.5	26	2.050	0.054	0.1748	3.91	230	1	3.66	1.59	226.34	1010.97	10

2 EE 4 VOLTAGE DROP AND SHORT CIRCUIT CALCULATION

SCALE NTS

CIRCUIT 1
LOADS : 8 - 1x40W SURFACE INDUSTRIAL TYPE FLUORESCENT LAMP
I = 8(40) / 0.6(230) = 2.32 A
USE : 20 A, 2P, 240V CIRCUIT BREAKER
2-3.5 SQ. MM THHN COPPER WIRE
IN 20 MM DIA. UPVC PIPE

CIRCUIT 2
LOADS : 2 - 2x26W RECESSED TYPE DOWN LIGHT
8 - 1x40W SURFACE INDUSTRIAL TYPE FLUORESCENT LAMP
I = 8(40)+2(2x26)/0.6(230) = 2.70 A
USE : 20 A, 2P, 240V CIRCUIT BREAKER
2-3.5 SQ. MM THHN COPPER WIRE
IN 20 MM DIA. UPVC PIPE

CIRCUIT 3
LOADS : 9 - 2x26W RECESSED TYPE DOWN LIGHT
5 - 1x40W SURFACE INDUSTRIAL TYPE FLUORESCENT LAMP
I = 5(40)+9(2x26)/0.6(230) = 4.84 A
USE : 20 A, 2P, 240V CIRCUIT BREAKER
2-3.5 SQ. MM THHN COPPER WIRE
IN 20 MM DIA. UPVC PIPE

CIRCUIT 4
LOADS : 3 - 180VA DUPLEX CONV. OUTLET
I = 3(180) / 230 = 2.35 A
USE : 20 A, 2P, 240V CIRCUIT BREAKER
2-3.5 SQ. MM THHN COPPER WIRE
1-2.0 SQ. MM THHN COPPER WIRE(G)
IN 20 MM DIA. UPVC PIPE

CIRCUIT 6
LOADS : 8 - 180VA DUPLEX CONV. OUTLET
I = 8(180) / 230 = 6.26 A
USE : 20 A, 2P, 240V CIRCUIT BREAKER
2-3.5 SQ. MM THHN COPPER WIRE
1-2.0 SQ. MM THHN COPPER WIRE(G)
IN 20 MM DIA. UPVC PIPE

CIRCUIT 7 UP TO 10(SPARE) I = 5.0 A

MAIN FEEDER :
II = 42.38 A
AT 80% DEMAND FACTOR
I = 0.8(42.38) = 33.90 A
USE : 100 A, 2P, 240V 25KAIC
MAIN CIRCUIT BREAKER
2-30.0 SQ. MM THHN COPPER WIRE
1-8.0 SQ. MM TW COPPER WIRE(G)
IN 40 MM DIA. UPVC PIPE

3 EE 4 DESIGN ANALYSIS

SCALE NTS

PLUMBING PLANS

GENERAL

1. All plumbing works included herein are executed in accordance w/ the provisions of the Philippine Plumbing Code, the National Building Code and the Rules And Regulations of the City of Baguio.

2. Coordinate the drawings with other related drawings and specifications. the Engineer and/or the Architects are notified immediately of any discrepancy found herein.

3. All pipes are installed as indicated, any relocations required for proper execution of the plumbing works are with prior to approval of the Engineer and/or the Architects.

4. Proposed sanitary utilities are conform to the actual location,depth and invert elevations of all existing pipes and structures as verified by the Contractor.

5. Slopes for sanitary drainage line are maintain one percent (0.01) minimum respectively unless otherwise specified.

6. Water supply pipe to fixtures are sized in accordance with the manufacturer's recommendations.

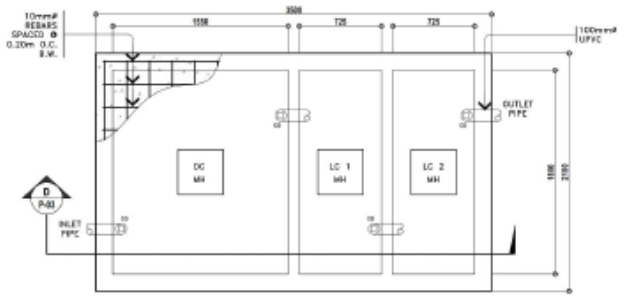
7. Refrigerant suction line and condensate drain line are insulated with closed cell elastomeric thermal insulation. insulation thickness are 25mm. thick for the drain lines. insulation installed outdoor, are provided with aluminum cladding.

8.The Contractor shall verify all existing utilities at the site and coordinate the work with the sewer and the storm drainage line effluent disposal point and water line service connecting/tapping point.

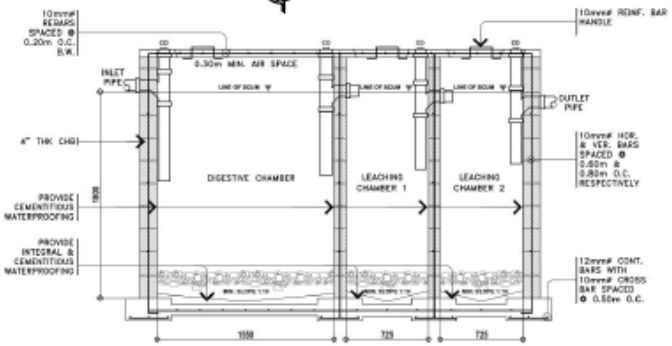
9. All pipe sizes and other dimensions are in millimeters (mm) unless otherwise specified.

LAV		Lavatory
UR		Urinal
WC		Water Closet
FD	◘	Floor Drain
FCO		Floor Cleanout
WCO		Wall Cleanout
VTR		Vent Thru Roof
PVC		Polyvinyl Chloride
SP		Soil Pipe
SV		Septic Vault
		Drainage Line
		Water Line
		Sanitary Line
		Downspout
WM	Ⓦ	Water Meter
CV		Check alve
GV		Gate Valve
CB	□	Catch Basin
	○	Downspout
FDE	■	Dome TypeFloor Drain

PLUMBING NOTES
NOT TO SCALE

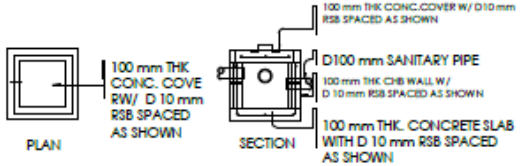


SEPTIC TANK PLAN VIEW
NOT TO SCALE



SEPTIC TANK SECTION DETAIL
NOT TO SCALE

AREA DRAIN DETAILS
NOT TO SCALE



CATCH BASIN
NOT TO SCALE

II. SEPTIC TANK DIMENSION

21- 25 DFU = 1200 GALS
1200 GALS-5.45m³
SV VOLUME = <5.45 but> 6m³

DIMENSION (LxWxH)

DIGESTIVE = 1x1.5x1.5 =2.25
LEACHING 1&2 = 1x1x1.5=1.8(2)=3.6
5.85m³

III. DWV PIPE

① SOIL PIPE = 3" SERIES 1000 SANITARY UPVC PIPE
② WASTE PIPE = 2" SERIES 1000 SANITARY UPVC PIPE
③ DRAINAGE PIPE
  ⓐ DRAINAGE PIPE = 2"ø SERIES 1000 SANITARY UPVC PIPE
  ⓑ HOUSE DRAIN = 4"ø SERIES 1000 SANITARY UPVC PIPE
④ VENT PIPE = 2"ø SERIES 1000 SANITARY UPVC PIPE

IV. WATER DEMAND LOAD AND PIPE SIZING

A) WSFU

BRANCH I/RISER I = 5.5 WSFU = 5.5 GPM
BRANCH II = 5.5 WSFU = 5.5 GPM
BRANCH III = 6.5 WSFU = 5.5 GPM
BRANCH IV = 11 WSFU = 10 GPM

BUILDING MAIN = 5.5+5.5+6.5=17.5 WSFU
17.5 WSFU = 13.5 GPM

B) DEMAND COMP.

MIN. RESIDUAL PRESSURE = 8 PSI
STATIC RESIDUAL PRESSURE = 7.1 PSI
TOTAL DUCTION LOSS = 11.9 PSI
DEV. LENGTH = 50 FT
AVE. PERMISSIBLE FRICTION LOSS PER LENGTH = 23.0 PSI/100FT LENGTH
TOTAL DEMAND IS 13.5 GPM

C) SUPPLY PIPE SIZE

ⓐ MAIN BRANCH = ¾" OR 20mm ø UPVC BLUE OR PPR PIPE
ⓑ BRANCH A = ½" OR 12.5mm ø UPVC BLUE OR PPR PIPE
ⓒ BRANCH A OC 2 OC RISER = ½" OR 12.5mm ø UPVC BLUE OR PPR PIPE
ⓓ BRANCH B = ½" OR 12.5mm ø UPVC BLUE OR PPR PIPE

V. WATER TANK VOLUME

ASSUME 10 PAX

10(110 LITERS/DAY) = 1100 LI/DAY
1100 - 290.60 GALS/DAY
ASSUME (3) DAYS OUTAGE
290.6003 = 871.8 GALS
SAY = 1003.85 GALS/3000 LI

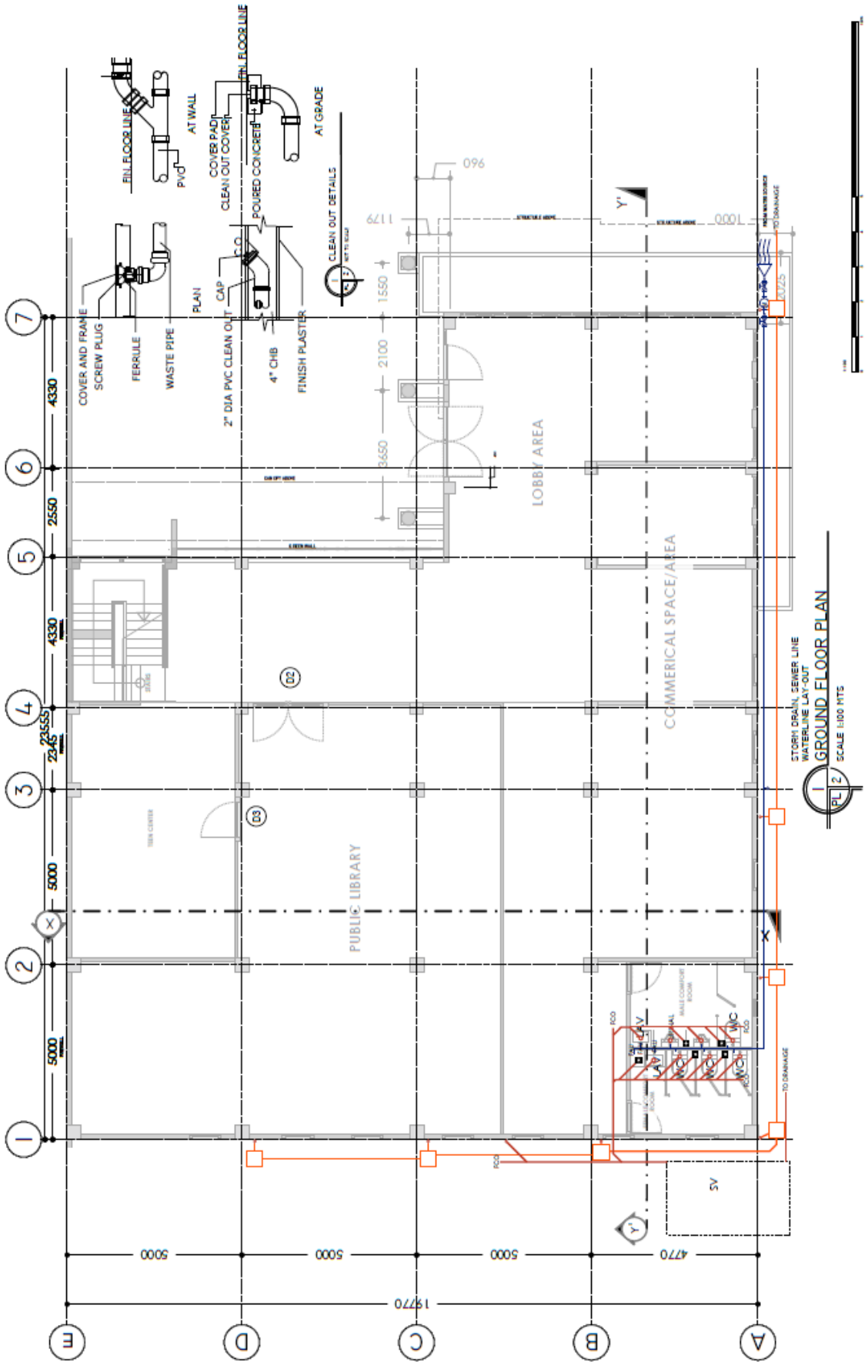
VI. PUMP HP REQUIREMENT

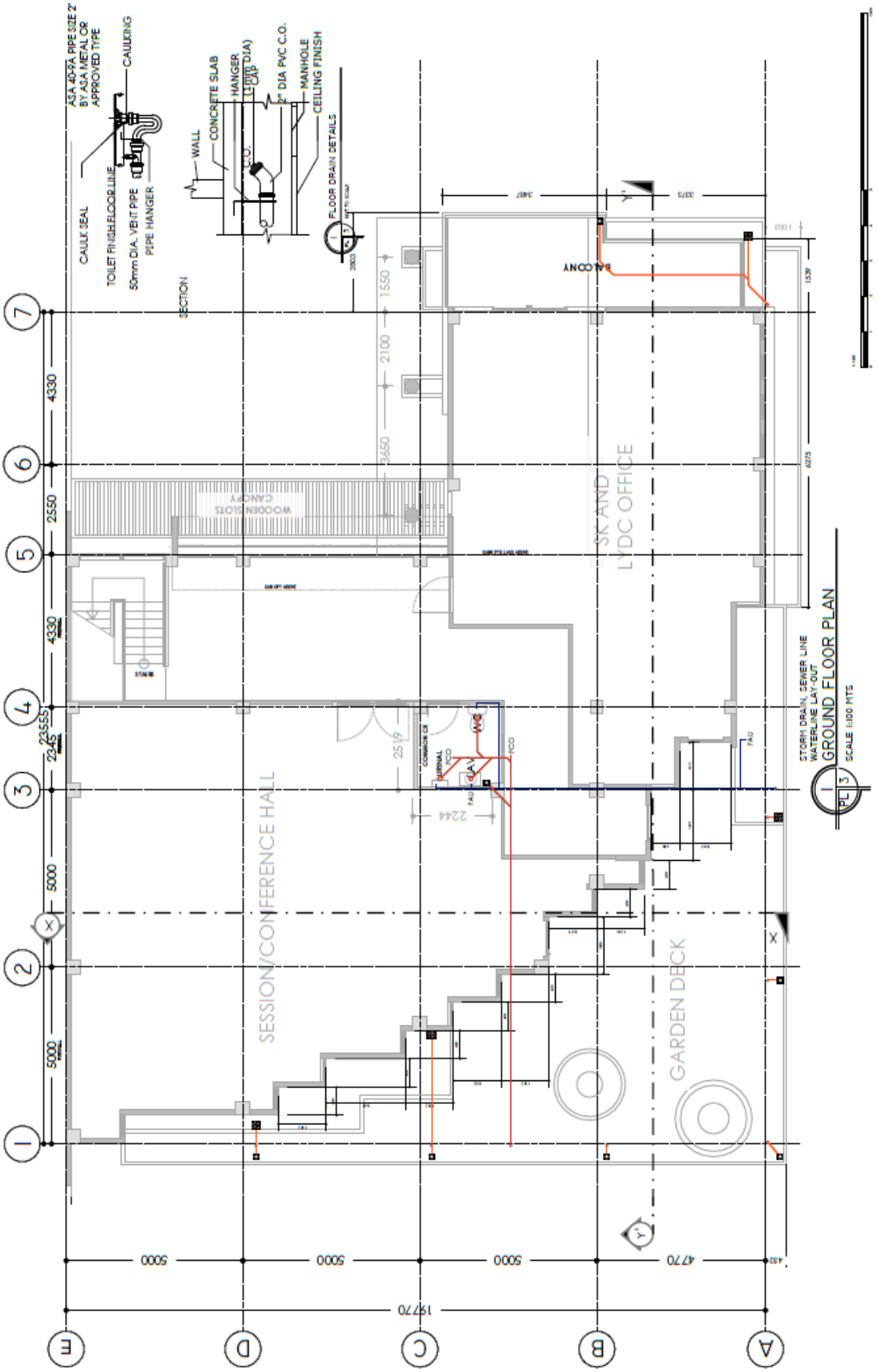
VOLUME = 1003.85 GALS
FILLING TIME = 1 HOUR
GPM = 1003.85 GALS/60 = 17GPM
TDH = 25 FT
PUMP EFF = 60%
PUMP HP = 17(25/3960)(.60)
= 0.6 HP min. REQ.T
= SAY 0.5 HP
GAP = 17 GPM@ 25FT TOH

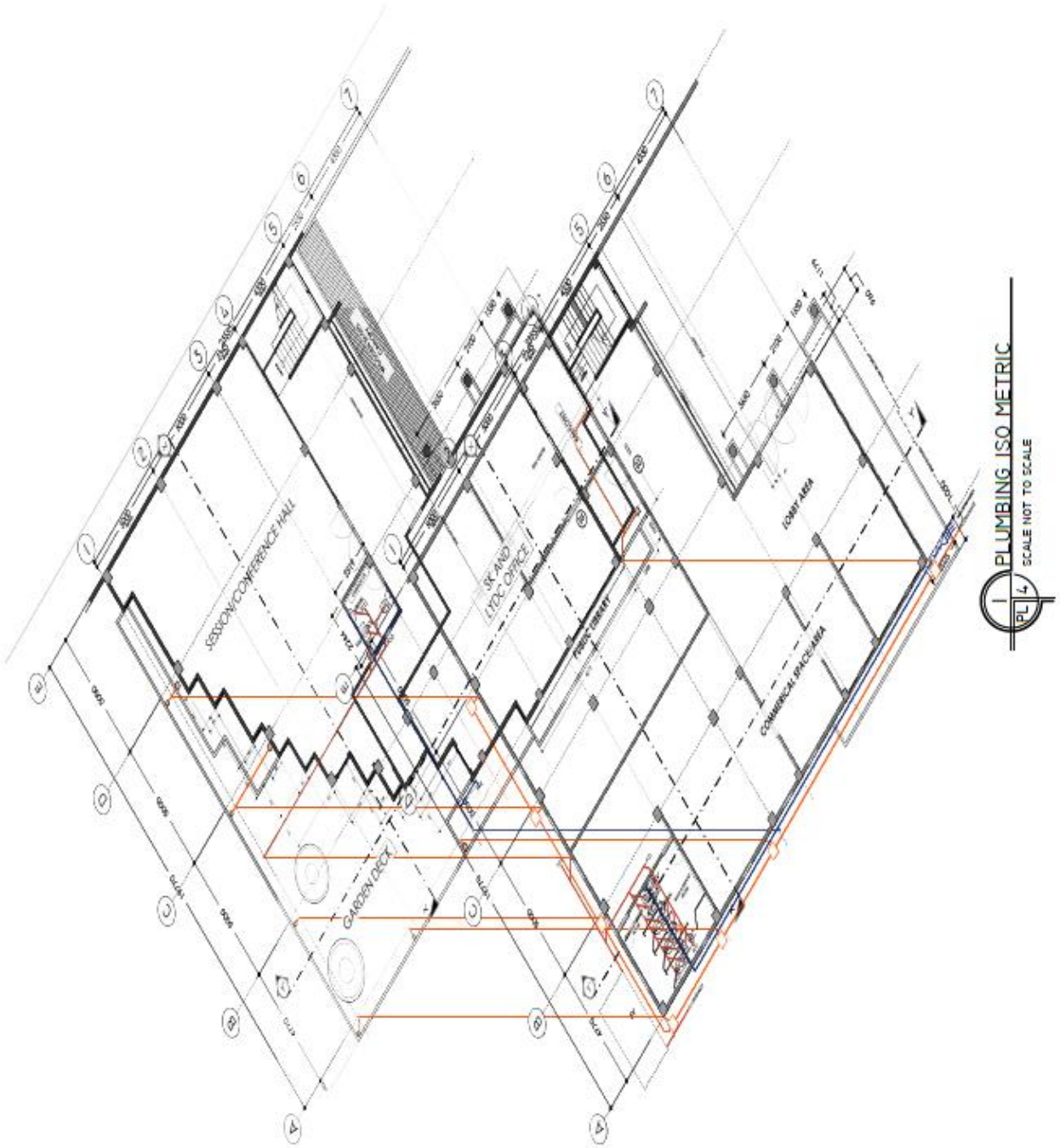
VIII. STORM DRAIN DETAIL

a SIZE OF DRAIN&LEADER
2"ø/5.08cm ø UPVC OPENING O.C LEADER PIPE

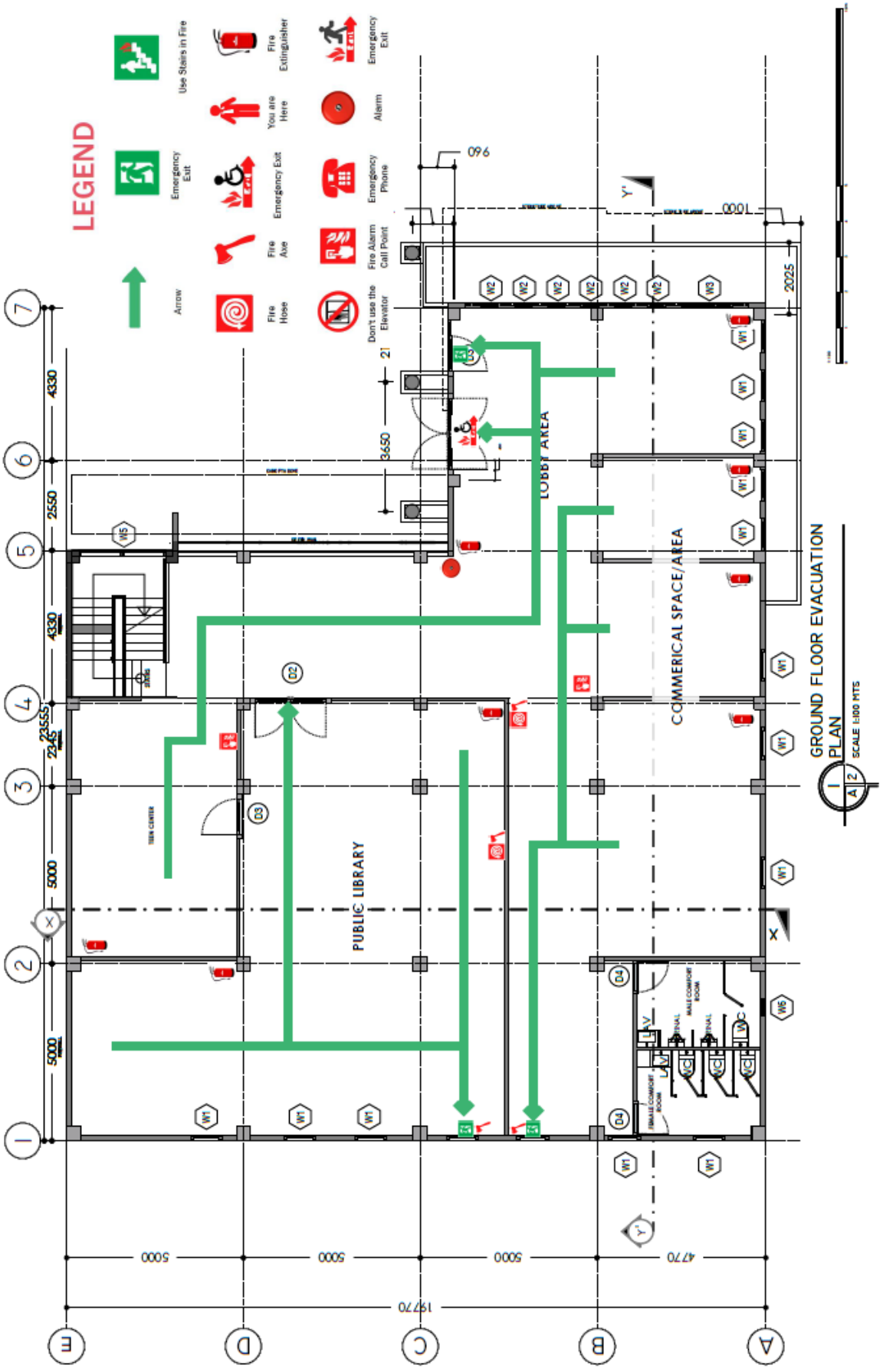
b GUTTER SIZE
GUTTER DEPTH
4"/10.16cm GUTTER DEPTH

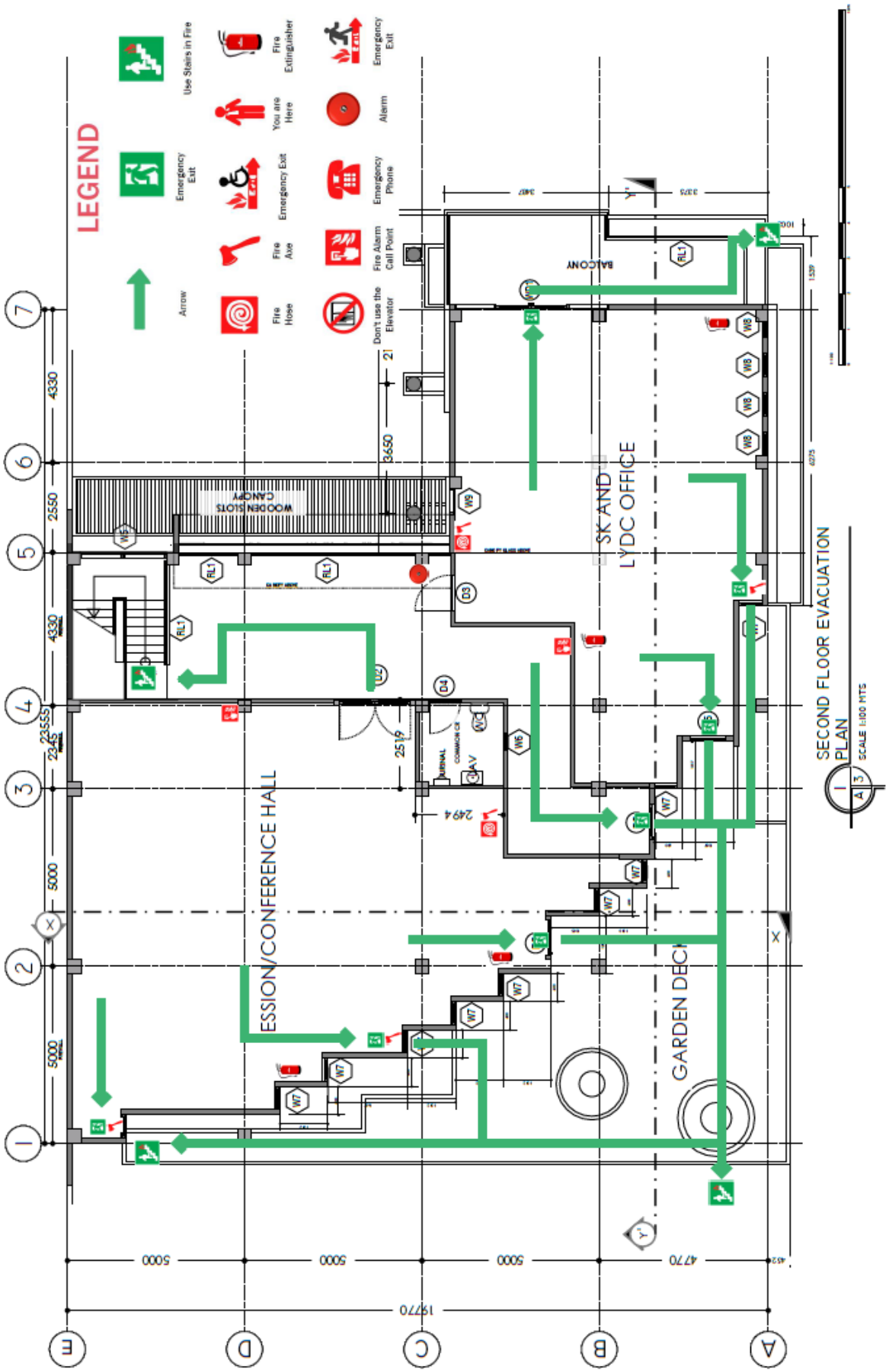

FIN. FLOOR LINE
AT WALL
PVC
COVER PAD
CLEAN OUT COVER
FIN. FLOOR LINE
POURED CONCRETE
AT GRADE
CLEAN OUT DETAILS
COVER AND FRAME
SCREW PLUG
FERRULE
WASTE PIPE
PLAN
CAP
2" DIA PVC CLEAN OUT
4" CHB
FINISH PLASTER
LOBBY AREA
COMMERICAL SPACE/AREA
PUBLIC LIBRARY
STORM DRAIN, SEWER LINE
WATERLINE LAY-OUT
GROUND FLOOR PLAN
SCALE 1:100 MTS
TO DRAINAGE
19770
5000
4770
4330
2550
2345
2355
3650
2100
1550
1179
1000
096


GROUND FLOOR PLAN
SCALE 1:100 MTS
STORM DRAIN, SEWER LINE
WATERLINE LAY-OUT
SESSION/CONFERENCE HALL
SK AND
LYDC OFFICE
GARDEN DECK
BALCONY
WOODEN SLOTS
CANOPY
SECTION
CAULK SEAL
TOILET FINISH/FLOOR LINE
50mm DIA. VENT PIPE
PIPE HANGER
CAULKING
ASA 40-9A PIPE SIZE 2"
BY ASA METAL OR
APPROVED TYPE
WALL
CONCRETE SLAB
HANGER
(12MM DIA)
CAP
4" DIA PVC C.O.
MANHOLE
CEILING FINISH
FLOOR DRAIN DETAILS
19770
5000
4770
4330
2550
2100
1550
3650
6275
1539
2519
2244


SESSION/CONFERENCE HALL
SK AND LTDC OFFICE
THICK CEMENT
LOBBY AREA
COMMERCIAL SPACE AREA
GARDEN DECK
PLUMBING ISO METRIC
SCALE NOT TO SCALE

EVACUATION PLANS


LEGEND
Use Stairs in Fire
Fire Extinguisher
Emergency Exit
Emergency Exit
You are Here
Alarm
Emergency Exit
Emergency Exit
Emergency Phone
Fire Axe
Fire Alarm Call Point
Fire Hose
Don't use the Elevator
Arrow
LOBBY AREA
COMMERICAL SPACE/AREA
PUBLIC LIBRARY
GROUND FLOOR EVACUATION PLAN
SCALE 1:100 MTS
19770
5000
5000
5000
4770
4330
2550
4330
5000
5000
3650
2025
1000
960


LEGEND
Use Stairs in Fire
Fire Extinguisher
Emergency Exit
Emergency Exit
You are Here
Alarm
Emergency Exit
Emergency Phone
Fire Axe
Fire Alarm Call Point
Arrow
Fire Hose
Don't use the Elevator
SK AND LYDC OFFICE
ESSION/CONFERENCE HALL
GARDEN DECK
BALCONY
WOODEN SLOTS CANOPY
SECOND FLOOR EVACUATION PLAN
SCALE 1:100 MTS

Chapter VI

Project Implementation

6.1 Implementation Scheme

The proposed project will be introduced to the Municipality of Lambunao, Iloilo. The engineering department of the municipality will thoroughly assess and attest the proposed project for the feasibility, design and procedures of work to be carried out.

After receiving a consent, along with any changes and revisions, the municipality shall hold a bidding process open to all public and private contractors. Under the discretion of the municipality, the participants would join, preferably, through invitation. The project will then be awarded to the lowest and efficient bidder. Due to the size of the project, there may be more than one, in which case, the hierarchy of authority, i.e. contractor and subcontractors, shall be decided by the municipality of Lambunao, Iloilo.

6.2 Construction Management

Once the hierarchy of authority has been set by the municipality of Lambunao, the construction of the project will be managed by the contractor with progress reports duly submitted at the end of a certain time period to be scheduled by the municipality. To follow the specification down to the last detail, progress reports will be required for monitoring purposes of the development of the project.

6.3 Finance and Management

Municipality of Lambunao, Iloilo will be responsible for the funding of the proposed project. Proper budgeting all throughout the duration of the project construction shall be handled and tracked by the municipality. The municipality shall also monitor the work progress of the construction of the project as budgeting schemes will have a huge impact by this.

6.4 Organizational Structure

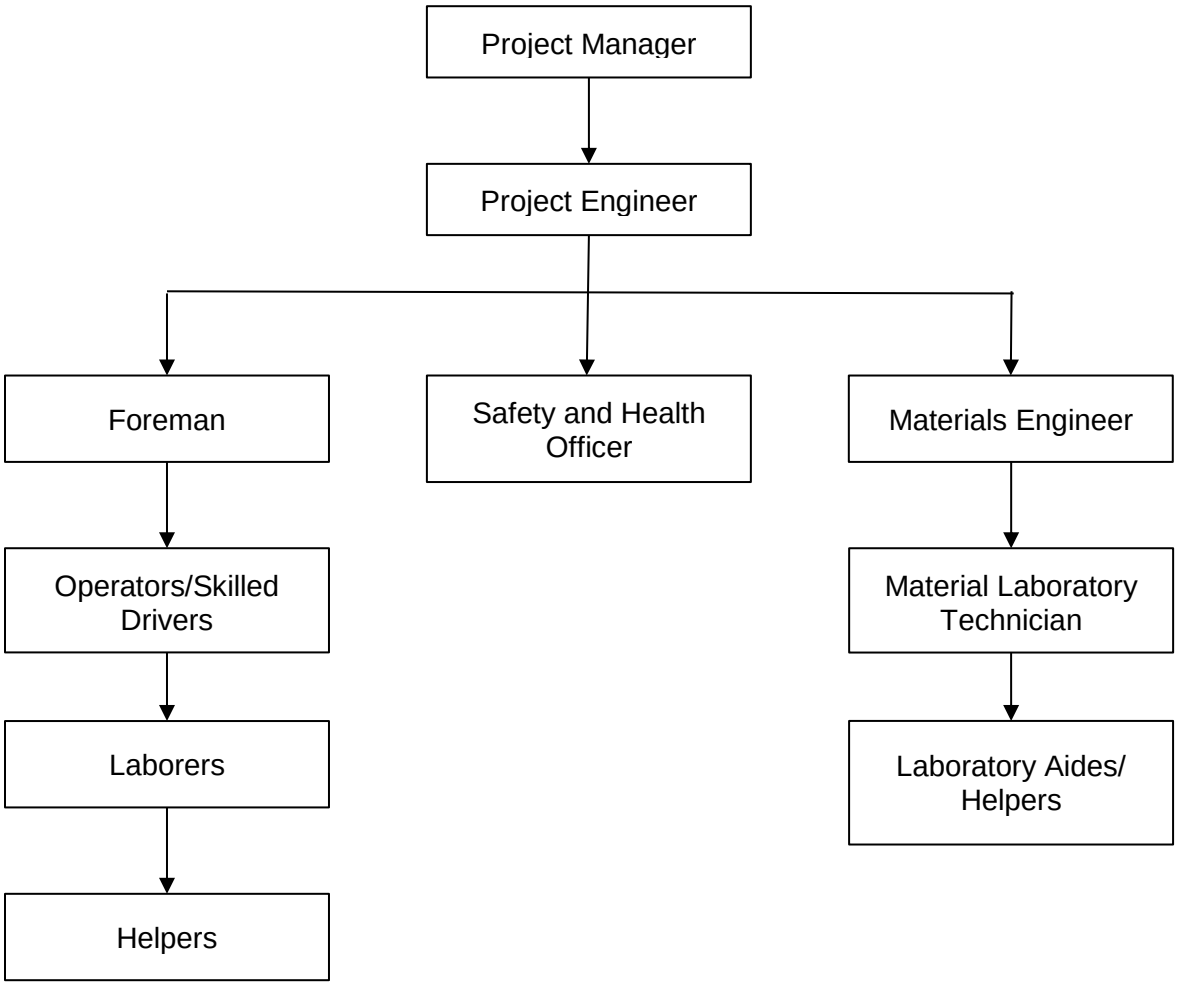


Figure 33

Hierarchy of authority for the proposed design of a two-storey Sangguniang Kabataan building with Local Youth Development Council in Lambunao, Iloilo.

According to the paradigm depicted in Figure 33, the project manager is the person in charge of executing the project. He/she is in charge of leading and managing the project team on a daily basis. As a result, a project engineer was employed to work in the field and monitor reports. Project engineers work with their team on the job site to provide guidance and resolve issues as well as to document and record progress. The materials engineer will establish

budgets, assess labor expenses, make reports, and manage the work of technologists, technicians, and other engineers and scientists. He/she will plan and oversee the testing of processing techniques. Construction material testing and inspection will then be carried out by the material laboratory technician and the lab assistant. A safety officer develops, enforces, and oversees security for employees at work for the company as a whole.The foreman ensures all typical issues on the job site are resolved. A truck driver will bring supplies and services to the project site. Once the supplies are ready, the laborers assist with daily operations at the construction site by preparing the worksite, unloading goods, cleaning debris, and performing other jobs as instructed with the aid of the helper.

Chapter VII

Summary, Conclusion, and Recommendations

7.1 Summary

Young people must actively participate in the development of their community and peers, as expressed in the famous line from Jose Rizal's "A la Juventud Filipinas" (To The Filipino Youth): "Ang Kabataan ang pag-asa ng bayan." The Philippines pioneered youth and child participation in local governance. As such the need for building up infrastructures supporting Lambunaonon youth leaders to assist the youth concerns in the Lambunao. The proposed two-storey SK building and LYDC office is a way to aid such need.

The proposed design of the two-storey building features 1 conference room for hosting Lambunaonon young leaders in addition to 3–4 commercial areas, a lobby, garden deck, teen center, a huge office space, library, and separate restrooms for men and women on the first floor and a shared restroom on the second floor.

SK and LYDC officers, local youths, and business owners would be served by the proposed project. Vital data relevant to the project's description, facilities, and amenities required in the proposed project was gathered with the assistance of the Municipal Engineering Office, Municipal Assessor Office, and other contributors. The site was assessed, and soil tests were performed to determine the allowed soil carrying capacity and other soil parameters. The findings were examined using a group discussion, manual calculations, and the usage of different softwares.

Architectural, structural, plumbing, and electrical designs were laid-out along with the incorporation of green technologies namely, natural lighting, sound-attenuating laminated panes, green walls, and polycarbonate and metal roof. Cost estimation of the project was determined using Excel applying what was learnt in the Quantity Surveying. The estimated

project cost was PHP 22,188,008.49. Using PERT-CPM, the project was estimated to be finished within 210 days.

7.2 Conclusion

The proposed project successfully provided the design of a two-storey Sangguniang Kabataan Building with Local Youth Development Council Office. The proposed project's structural aspect was the emphasis of the design. The architectural, structural, plumbing, and electrical designs were created in compliance with the applicable codes, rules, and regulations. Table 17 shows how the identified problems, such as no SK and LYDC office, limited accessibility of teen centers for the local youths, and no existing public library, were handled.

The SK building with LYDC office would serve as a meeting space for the SK and LYDC officers of Lambunao as well as a learning center and venue for recreational activities for the local youths. It was determined that all of the study's objectives had been met with the abovementioned accomplishments.

Table 17

Problems addressed in Chapter I

Identified Problems	Solutions Incorporated in the Design
No SK and LYDC Office	The SK building with a LYDC office was designated on the second floor of the proposed design with a total gross floor area of 95 square meters that can cater a maximum of 30 youth leaders. Additionally, a conference room for meetings with a total gross floor area of 134.5 square meters can accommodate 80-90 persons.
No existing public library	A library was located in the ground floor of the building with a total gross floor area of 115.5 square meters that can accommodate a maximum of 40 open for out-of-school local youths and students of Lambunao.
Limited accessibility of the teen centers	Located on the ground floor, the teen center was also included in the design of the proposed structure with a total gross floor area of 34 square meters that can cater 10-15 local youths.

7.3 Recommendations

The two-storey Sangguniang Kabataan Building with Local Youth Development Council Office has a lot of functions and the researchers recommend implementing this proposed project. The structural analysis and design are also advised for further investigation and assessment to guarantee that all calculations and design methodologies are on track to ensure structural integrity. Soil tests were performed to determine the various soil parameters; however, these tests could potentially be redone if the engineer requests these.

Furthermore, maintenance must be done regularly to ensure the safety of the beneficiaries. Safety and security should be a priority, hence, CCTV cameras should be installed in every corner of the building and security personnel to monitor and guard the building

since it is a public space, and it is open for everyone. There should be an electrical/power room for power generators to supply enough power for the two-storey building.

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APPENDICES

APPENDIX A
WORK BUDGET

WORKING BUDGET

MISCELLANEOUS		BUDGET
Transportation		PHP 500
Others		PHP 1500
	Total	PHP 2000

DOCUMENTATION		BUDGET
GRAMMARIAN		PHP 1000
Paper Allowance		PHP 750
Plagiarism Scan		PHP 1000
Printing		PHP 1000
Book Bind		PHP 3500
	Total	PHP 7250

PROFESSIONAL FEES		BUDGET
Architectural Plans		PHP 4000
Plumbing Plans		PHP 2000
Electrical Plans		PHP 2000
	Total	PHP 8000

	TOTAL BUDGET	**PHP 17, 250.00**

APPENDIX B
WORK SCHEDULE

RESEARCH SCHEDULE OF ACTIVITIES										
TASK ASSIGNED	WEEK 1 /17/22 - 8/25/2	WEEK 2 /26/22 - 8/29/2	WEEK 3 /30/22 - 9/9/2	WEEK 4 /12/22 - 9/18/2	WEEK 5 /19/22 - 9/26/2	WEEK 6-7 /27/22 - 10/8/2	WEEK 8-10 0/10/22 - 11/4/22	WEEK 11 11/5/22 - 11/11/22	WEEK 12-13 1/13/22 - 11/25/22	WEEK 14-18 1/27/22 - 12/23/22
Orientation										
Brainstorming and Problem Identification										
Send Out Letters to chosen Municipalities										
Visiting Municpalities										
Creating Concept Papers										
Review and Resubmission of Concept Papers										
Submission and Selection of Final Concept Paper										
Site Visit										
Chapter 1 (Discussion and Formulation)										
Chapter 2 (Discussion and Formulation)										
Chapter 3 (Discussion and Formulation)										
Checking and Revising of Chapters 1-3										
Consultation with the Adviser and Course Coordinator										
Final Proposal of Chapters 1-3										

RESEARCH SCHEDULE OF ACTIVITIES									
TASK ASSIGNED	WEEK 19	WEEK 20-21	WEEK 22-23	WEEK 24	WEEK 25	WEEK 26	WEEK 27-28	WEEK 29-30	WEEK 31
	12/24/22 - 12/30/22	12/31/22 - 1/14/23	1/15/23 - 2/4/23	2/5/23 - 2/11/23	2/12/23 - 2/18/23	2/19/23 - 2/25/23	2/26/23 - 3/11/23	3/12/23 - 3/25/23	3/26/23 - 4/1/23
Christmas Break									
Final Consultation									
Final Revisions									
Proposal Defense									
Revisions After Proposal									
Chapter 4 (Formulation and Discussion)									
Site Visit									
Consultation with Adviser									
Chapter 5 (Discussion and Formulation)									
Designing Electrical and Plumbing plan, Truss, Beams, and Slab Designs									
Prelims									
Chapter 6 (Formulation and Discussion)									
Compilation of the Plans, Estimates and Project cost, Construction of Project's Work Schedule									
Midtterms									

RESEARCH SCHEDULE OF ACTIVITIES					
TASK ASSIGNED	WEEK 32-33 4/2/23 - 4/22/23	WEEK 34 4/23/23 - 4/29/23	WEEK 35 4/30/23 - 5/6/23	WEEK 36 5/7/23 - 5/14/23	WEEK 37 5/15/23 - 5/20/23
Consultation with the Adviser and Course Coordinator					
Revisions, Grammar Check and Plagiarism Check					
Finalr					
Submission to Adviser for Checking and Approval					
Bookbinding					
Submission of Thesis					
Finals					

APPENDIX C
LETTERS

COLLEGE of ENGINEERING
CENTRAL PHILIPPINE UNIVERSITY
ILOILO CITY PHILIPPINES
Tel Nos (033) 329 1971 (to79) local 1082
Fax No (033) 320 3004
CIVIL ENGINEERING DEPARTMENT

September 6, 2022

HON. MAYOR REYNOR R. GONZALES
Municipality of Lambunao
Iloilo, Province

TO: HRMO
MEO
Reynor.
7 Sep 22

Dear Hon. Mayor Reynor R. Gonzales,

Greetings!

The Bachelor of Science in Civil Engineering (BSCE) curriculum in the Philippines requires civil engineering students to develop a practice-based design or research which incorporates the various aspects of a typical engineering undertaking. At Central Philippine University (CPU), Iloilo City, Service Learning (SL) is integrated in this program by requiring all students to conduct a community-oriented design project (CODP) over a period of two semesters.

CE 4131 (Civil Engineering Project I) and CE 4231 (Civil Engineering Project II) are subjects taken by senior BSCE students of CPU. These courses are geared towards the use of civil engineering background in probable community development projects or industry research. Students are grouped by five or six members with a civil engineering faculty adviser to undertake a research or project study on the design of civil engineering projects such as water supply system, public market, slaughterhouse, hospital, drainage system, transportation research among others.

This CODP activity requires the students to undergo two defense presentations, a project proposal defense this semester and a final project study defense next semester. During the project proposal stage, the students have to focus on the problems and convince the panel that indeed there is a need for the project. Once the proposal is approved, they could now proceed to the actual research or project study which will include the application of their civil engineering knowledge through technical drawings and details. The project design and details will be refined during the final project study defense. Admittedly, the project study may have deficiencies considering the fact that they are made by students and not by practicing professionals. However, with the help of advisers, we hope that the students can come up with a satisfactory project study. A hard-bound copy of the completed project study will be given to the partner community.

If you are interested in this endeavor, please inform us of your priority projects (in its conceptual stage) of which we could be of assistance through Ms. Lovelyn Losaria, you may reach her through mobile phone number at: 09673344200 (Globe) or email at: lovelyn.losaria-18@cpu.edu.ph.The completed project study will be beneficial both to the students as well as the partner community in a sense that (a) the students will have the chance to work on real community projects and apply their civil engineering knowledge as well as understand the value of community service and (b) a priority project of the partner community will have its preliminary design which can be referred to in future project proposals.

Looking forward to a successful partnership with your community.

Thank you.

Yours truly,

ENGR. MARY EARL DARYL A. GRIO
Chairperson, Civil Engineering Department

ENGR. DANY C. MOLINA
Dean, College of Engineering

OFFICE OF THE MAYOR
HON. REYNOR R. GONZALES
LAMBUNAO
RECEIVED
DATE: 9/07/2022 11:1

Copy from the Office of the Mayor sent to the Human Resource Office and Municipal Engineering

COLLEGE of ENGINEERING
CENTRAL PHILIPPINE UNIVERSITY
ILOILO CITY PHILIPPINES
Tel Nos (033) 329 1971 (to79) local 1082
Fax No (033) 320 3004
CIVIL ENGINEERING DEPARTMENT

September 6, 2022

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Iloilo, Province

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Greetings!

The Bachelor of Science in Civil Engineering (BSCE) curriculum in the Philippines requires civil engineering students to develop a practice-based design or research which incorporates the various aspects of a typical engineering undertaking. At Central Philippine University (CPU), Iloilo City, Service Learning (SL) is integrated in this program by requiring all students to conduct a community-oriented design project (CODP) over a period of two semesters.

CE 4131 (Civil Engineering Project I) and CE 4231 (Civil Engineering Project II) are subjects taken by senior BSCE students of CPU. These courses are geared towards the use of civil engineering background in probable community development projects or industry research. Students are grouped by five or six members with a civil engineering faculty adviser to undertake a research or project study on the design of civil engineering projects such as water supply system, public market, slaughterhouse, hospital, drainage system, transportation research among others.

This CODP activity requires the students to undergo two defense presentations, a project proposal defense this semester and a final project study defense next semester. During the project proposal stage, the students have to focus on the problems and convince the panel that indeed there is a need for the project. Once the proposal is approved, they could now proceed to the actual research or project study which will include the application of their civil engineering knowledge through technical drawings and details. The project design and details will be refined during the final project study defense. Admittedly, the project study may have deficiencies considering the fact that they are made by students and not by practicing professionals. However, with the help of advisers, we hope that the students can come up with a satisfactory project study. A hard-bound copy of the completed project study will be given to the partner community.

If you are interested in this endeavor, please inform us of your priority projects (in its conceptual stage) of which we could be of assistance through Ms. Lovelyn Losaria, you may reach her through mobile phone number at: 09673344200 (Globe) or email at: lovelyn.losaria-18@cpu.edu.ph.The completed project study will be beneficial both to the students as well as the partner community in a sense that (a) the students will have the chance to work on real community projects and apply their civil engineering knowledge as well as understand the value of community service and (b) a priority project of the partner community will have its preliminary design which can be referred to in future project proposals.

Looking forward to a successful partnership with your community.

Thank you.

Yours truly,

ENGR. MARY EARL DARYL A. GRIO
Chairperson, Civil Engineering Department

ENGR. DANY C. MOLINA
Dean, College of Engineering

RECEIVED
SEP 07 2022

OFFICE OF THE MAYOR
HON. REYNOR R. GONZALES
LAMBUNAO
DATE: 9/07/2022
TIME: 11:24
BY:

RECEIVED
9-7-22
DATE

Office

PARISH OF SAN NICOLAS DE TOLENTINO
Lambunao, Iloilo

PTC file

EXCERPT FROM THE MINUTES OF THE MEETING OF THE THREE PARISH COUNCILS HELD AT THE TINAGONG DAGAT PARISH HALL, LAMBUNAO, ILOILO ON APRIL 7, 2022

RESOLUTION NO. 2
Series of 2022

A RESOLUTION AUTHORIZING THE PARISH PRIEST TO RECEIVE THE RENTAL OF THE CHURCH LOT IN THE AMOUNT OF FORTY THOUSAND PESOS (₱40, 000. 00) PER MONTH FOR TWENTY FIVE (25) YEARS

WHEREAS, the Parish of San Nicolas De Tolentino has a lot situated at Ladrido St., Poblacion Ilawod, Lambunao, Iloilo,

WHEREAS, the Local Government Unit of Lambunao is interested to rent the Lot in the amount of Forty Thousand Pesos (₱40, 000.00) per month for 25 years,

WHEREAS, the payment for the rental will be made in check, in the name of the Parish Priest,

NOW THEREFORE, on motion of Ms. Mildred Sulangob and duly seconded by Ms. Flocer Lera-og,

BE IT RESOLVED as it is hereby resolved to allow the Parish Priest of San Nicolas De Tolentino to receive the payment for the Lot rental and to remit this to the Parish Finance Council which will be used solely for the church projects.

RESOLVED FURTHER that this resolution be approved by Most Reverend Jose Romeo O. Lazo, Archbishop of Jaro for his information and guidance.

Unanimously Approved.

I hereby certify to the correctness of the above-quoted resolution.

CECILIA D. SUAREZ
Secretary

Attested:

CORAZON L. LEBATA
Chairman
Parish Pastoral Council

Recommending Approval:

REV.FR. MALONEY C. GOTERA
Parish Priest

Received by:
COPY G. HALAGO
5/16/22

APPROVED:

MOST REV. JOSE ROMEO O. LAZO, D.D.
Archbishop of Jaro

Received copy for the Researchers from the Office of the Mayor

YOUTH POPULATION OF THE MUNICIPALITY OF LAMBUNAO AGES 10-30 YEARS OLD

BARANGAY	IN SCHOOL	OUT OF SCHOOL	MALE	FEMALE	TOTAL
1 Agsirab	485	368	441	412	853
2.Agtuman	121	14	59	76	135
3. Alugmawa	200	175	199	176	375
4. Badiangan	67	63	74	56	130
5. Bagongbong	479	294	396	377	773
6. Balagiao	162	185	170	177	347
7 Banban	220	137	175	182	357
8 Bansag	313	188	311	190	501
9 Bayuco	90	83	75	98	173
10 Bin. Armada	62	52	64	50	114
11 Bin. Labayno	163	105	136	132	268
12 Bin. Limoso	116	64	96	84	180
13 Bin. Portigo	120	96	129	87	216

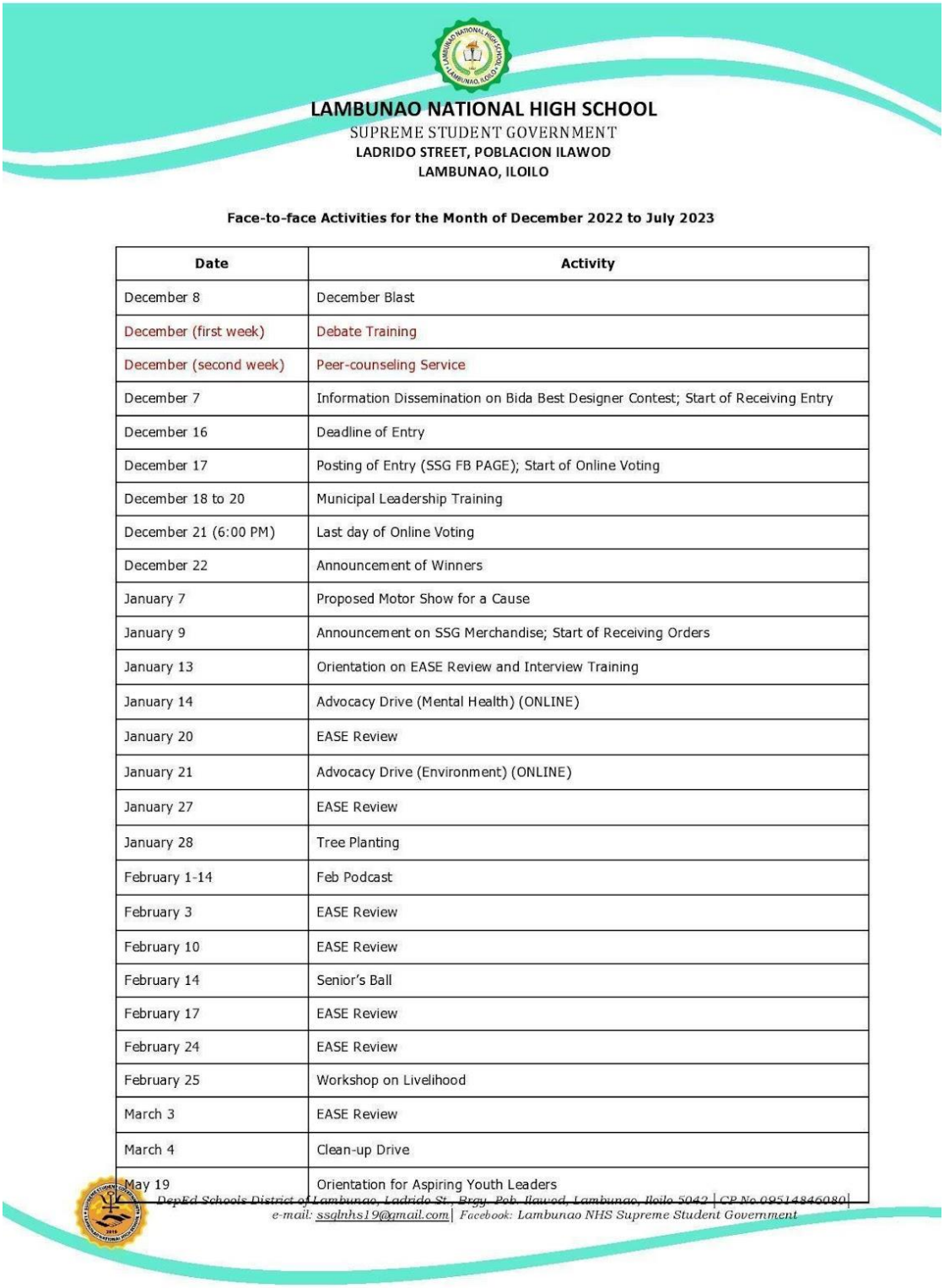
14 Bin. Tirador	183	132	166	149	315
15 Bonbon	298	207	267	238	505
16 Bontoc	466	265	354	377	731
17 Buri	122	83	103	102	205
18 Burirao	128	68	109	87	196
19 Buwang	114	85	117	82	199
20 Cabatangan	329	294	307	316	623
21 Cabugao	364	208	316	256	572
22 Cabunlawan	142	108	129	121	250
23 Caguisanan	439	320	403	356	759
24 Caloy-ahan	187	147	168	166	334
25 Caninguan	428	281	354	355	709
26 Capangyan	136	98	121	113	234
27 Cayan Este	130	58	102	86	188
28 Cayan Oeste	304	208	268	254	512
29 Corot-on	28	24	30	22	52
30 Coto	180	134	167	147	314

31 Cubay	277	212	253	236	489
32 Cunarom	292	206	247	251	498
33 Daanbanwa	351	271	318	304	622
34 Gines	303	200	264	238	503
35 Hipgos	270	199	264	205	469
36 Jayubo	1108	976	1006	1078	2084
37Jorog	98	77	100	75	175
38 Lanot Grande	120	119	126	113	239
39 Lanot Pequeño	98	48	84	62	146
40 Legayada	115	79	100	94	194
41 Lumanay	138	141	142	137	279
42 Madarag	133	126	129	130	259
43 Magbato	256	174	220	210	430
44 Maite Grande	211	183	208	186	394
45 Maite Pequeño	477	313	431	359	790
46 Malag-it	134	48	89	93	182
47 Manaulan	190	143	170	163	333

48 Maribong	794	559	669	684	1353
49 Marong	131	100	125	106	231
50 Misi	215	179	205	189	394
51 Natividad	140	138	153	125	278
52 Pajo	503	465	498	470	968
53 Pandan	207	135	164	178	342
54 Panuran	507	402	440	469	909
55 Pasig	314	254	299	269	568
56 Patag	117	78	94	101	195
57 Pob. Ilawod	639	369	493	515	1008
58 Pob Ilaya	640	314	488	466	954
59 Po-ong	181	106	145	142	287
60 Pughanan	596	459	557	498	1055
61 Pungsod	123	92	123	92	215
62 Quiling	29	32	28	34	61
63 Sagcup	200	107	161	146	307
64 San Gregorio	156	138	127	167	142
65 Sibacungan	351	247	325	283	598

66 Sibaguan	105	103	104	104	208
67 Simsiman	168	145	126	163	313
68 Supoc	88	49	72	65	137
69 Tampucao	356	285	357	284	641
70 Tranghawan	314	201	292	223	515
71 Tubungan	108	92	102	98	200
72Tuburan	153	111	153	111	264
73 Walang	620	451	579	492	1071

Sample of Calendar of Activities for the Students of Lambunao for December 2022-July 2023



LAMBUNAO NATIONAL HIGH SCHOOL
SUPREME STUDENT GOVERNMENT
LADRIDO STREET, POBLACION ILAWOD
LAMBUNAO, ILOILO

Face-to-face Activities for the Month of December 2022 to July 2023

Date	Activity
December 8	December Blast
December (first week)	Debate Training
December (second week)	Peer-counseling Service
December 7	Information Dissemination on Bida Best Designer Contest; Start of Receiving Entry
December 16	Deadline of Entry
December 17	Posting of Entry (SSG FB PAGE); Start of Online Voting
December 18 to 20	Municipal Leadership Training
December 21 (6:00 PM)	Last day of Online Voting
December 22	Announcement of Winners
January 7	Proposed Motor Show for a Cause
January 9	Announcement on SSG Merchandise; Start of Receiving Orders
January 13	Orientation on EASE Review and Interview Training
January 14	Advocacy Drive (Mental Health) (ONLINE)
January 20	EASE Review
January 21	Advocacy Drive (Environment) (ONLINE)
January 27	EASE Review
January 28	Tree Planting
February 1-14	Feb Podcast
February 3	EASE Review
February 10	EASE Review
February 14	Senior's Ball
February 17	EASE Review
February 24	EASE Review
February 25	Workshop on Livelihood
March 3	EASE Review
March 4	Clean-up Drive
May 19	Orientation for Aspiring Youth Leaders

DepEd Schools District of Lambunao, Ladrido St., Brgy. Pob. Ilawod, Lambunao, Iloilo 5042 | CP No.09514846080|
e-mail: ssglnhs19@gmail.com | Facebook: Lambunao NHS Supreme Student Government

APPENDIX D
LIST OF ORGANIZATIONS

Table 13

List of accredited organizations, acknowledged and nominated to be part of the Local Youth Development Council in the Municipality of Lambunao.

Name of Organization	Address or Office/ Residence of the President of the Organization	Number of members in Good Standing	Nature of the Organization
Gsp Troops No. 832-Lambunao NHS	Brgy. Coto, Lambunao, Iloilo	21	School Based
Binabaan Parish Youth Ministry	Brgy Binabaa, Lambunao, Iloilo	16	Faith Based
Agsirab Youth Organization	Brgy. Agsirab Lambunao, Iloilo	105	Community Based
Red Cross Youth	Brgy. Poblacion Ilawod, Lambunao, Iloilo	32	School Based
Lambunao Parish Youth Ministry	Brgy. Poblacion Ilawod, Lambunao, Iloilo	56	Faith Based
Binabaan NHS-Supreme Student Government	Brgy. Binabaan Labayno, Lambunao, Iloilo	13	School Based
I Love Lambunao Volunteer Team	Brgy. Poblacion Ilawod, Lambunao, Iloilo	60	Community Based
WVSU-LC Supreme Student Government	Brgy. Cunarom, Lambunao, Iloilo	40	School Based

Lambunao NHS Supreme Student Government	Brgy. Poblacion Ilawod, Lambunao, Iloilo	8	School Bases
Tau Gamma Phi/Sigma Triskelion De Lambunao	Brgy. Poblacion Ilawod, Lambunao, Iloilo	40	Community Based
Lambunao Brotherhood And Sisterhood	Brgy. Poblacion Ilawod, Lambunao, Iloilo	21	Community Based
Pag-Asa Youth Association Of The Philippines	Lambunao MSWD	15	Community Based
Ukapa Youth Organization	Brgy. Panuran, Lambunao, Iloilo	60	Community Based
Jayobo Youth Organization	Brgy. Jayobo, Lambunao, Iloilo	34	Community Based

APPENDIX E
LIST OF LYDC PLANS 2022-2024

Table 14

Local Youth Development Plan in the Municipality of Lambunao for the CY 2022-2024

Local Youth Development Plan								
Youth Development Center	Objectives	Performance Indicators	Targets			Programs/ Projects/Activities	Priority Areas	Annual Budget
			2022	2023	2024			
Increasing number of abused children and women	To disseminate on information on laws promoting the welfare of women and children	Decrease number of abused children and women				Conduct training and symposium on Violence Against Women and Children		P20,000
Increasing number of abused/ maltreated/ criticized LGBTQ+	To promote equality and gender sensitivity	Decrease number of abused/ maltreated/ criticized LGBTQ+				Conduct Training, seminars and activities that will showcase their talents.		P100,000
Incidence of suicide/ violence								
Unrestrained youths in basic first aid and sudden calamities	Preparedness for abrupt climate change and calamities	25 youth leaders were knowledgeable and trained on climate change and basic first aid				General training for basic first aid and preparedness for some unforeseen calamities		P50,000
Increasing number of youth offenders	To lessen the number of youth offenders	Decrease number of youth violators				Conduct series of religious retreats to families/ youths who were violators		P30,000
Increasing number of youth engaged in gambling, gangster,	To strengthen the community diversion program	Decrease number of youth engaged in gambling, gangster, alcoholism,				Conduct of sports activities		P300,000

alcoholism, and cigarette smoking		and cigarette smoking		
Increasing numbers of High School/ College dropouts	To help individuals especially the youths in developing their skills through a rigorous training program that will boost their chances of employ-ability	Decrease number of dropouts	Implementation of TESDA Skills Training	P50,000
Limited access of OSY to educational assistance, training and employment opportunities	To provide educational assistance to augment to their educational needs	100 poor and deserving youth will be provided with educational assistance	Educational Assistance for the poor and deserving students	P300,000
Lack of awareness on the IP culture	To expose youth in the different cultures and beliefs of local tribal group	Increase awareness	Site visit and exposure to school of the living tradition	P10,000
Lack of information on the role of the youth in nation building	To celebrate Linggo ng Kabataan	50% of youth groups/ organization will join the celebration	Celebrating Linggo ng Kabataan	P300,000
Lack of youth volunteer indifferent programs and activities conducted by the government	To increase volunteerism in the Municipality	Increase number of youth volunteers	Team building/ capability building activities for different organizations	P20,000

Increasing number of out of school youth (OSY)	To provide temporary employment to poor but deserving students, out-of-school youth, and dependents of displaced workers during summer to augment the family's income to pursue their education	5% of the total indigent youths will be provided with temporary employment through the different programs of the government	Implementation of Special Program Employment of Students (SPES)		P300,000
			Short Term Employment Program		P150,000
Increasing number of unemployed youth	To provide employment opportunities, career exploration and professional development	Decrease the number of unemployed youth	Conduct Job Fairs and Special Recruitment Activities		P50,000
Increasing incidence of casual sex, HIV, STD, and abortion	To raise awareness and prevent premarital sex, abortion, and other sexually transmitted diseases	Increase awareness and prevent premarital sex, abortion, and other sexually transmitted diseases	Conduct symposium on sexual and reproductive health.	Different schools and communities	P15,000
Increasing number of suicidal incidence	To raise awareness about depression and other mental condition to prevent suicides and other undesirable acts	Increase awareness about depression and other mental condition to prevent suicides and other undesirable acts	Symposium on mental health and strengthening ties with youth organization	Different schools and communities	P15,000

APPENDIX F

DETAILED COST ESTIMATES

BILL OF MATERIALS & DETAILED COST ESTIMATE					
ITEM NO.	DESCRIPTION	Quantity	Unit	Unit Cost	
I.	GENERAL REQUIREMENTS				
A1.	PERMITS AND CLEARANCES				
	Material Cost				
	PERMITS AND CLEARANCES	1.00	l.s.	₱ 30,000.00	₱ 30,000.00
B1.	PROJECT BILLBOARD / SIGNBOARD				
	Material Cost				
	Tarpaulin with text 8x8 (COA)	2.00	each	₱ 4,000.00	₱ 8,000.00
	Tarpaulin with text 4x8 (project)	2.00	each	₱ 4,000.00	₱ 8,000.00
	Marine Plywood (3/4" thk)	4.00	each	₱ 1,250.00	₱ 5,000.00
	Rough Lumber 2x2x8	40.00	each	₱ 135.00	₱ 5,400.00
	C.W.N. Asst.	4.00	kgs	₱ 145.00	₱ 580.00
C1.	OCCUPATIONAL SAFETY AND HEALTH PROGRAM				
	Material Cost				
	PPE	7.00	mo.	₱ 15,000.00	₱ 105,000.00
	SIGNAGES	1.00	l.s	₱ 10,000.00	₱ 10,000.00
D1.	MOBILIZATION / DEMOBILIZATION				
	Material Cost				
	MOBILIZATION/ DEMOBILIZATION	1.00	l.s	₱200,000.00	₱ 200,000.00
II.	FACILITY FOR ENGINEERS				
A2.	TEMPORARY FACILITY FOR ENGINEERS				
	Material Cost				
	TEMPORARY FACILITY FOR ENGINEERS	1.00	l.s	₱ 120,000.00	₱ 120,000.00
B2.	MAINTENANCE FOR THE FACILITY OF ENGINEERS				
	Material Cost				
	ELECTRICAL BILL	7.00	MOS.	₱ 2,500.00	₱ 17,500.00
	WATER BILL	7.00	MOS.	₱10,000.00	₱ 70,000.00
III.	EARTHWORKS				
A3.	CLEARING AND GRUBBING				
	Material Cost				
	CLEARING AND GRUBBING	1.00	l.s	₱ 25,000.00	₱ 25,000.00
B3	LAYOUTING AND STAKING				
	Material Cost				
	Nylon String	12.00	roll	₱ 120.00	₱ 1,440.00
	2x2x10 Coco Lumber	80.00	each	₱ 325.00	₱ 26,000.00
	4" CW Nails	10.00	kg	₱ 100.00	₱ 1,000.00
	2 1/2" CW Nails	6.00	kg	₱ 80.00	₱ 480.00
C3	EXCAVATION				
	Material Cost				
	Excavation	324.15	cu.m	₱ 128.00	₱ 41,491.71
	Equipment				
	Backhoe	12.00	days	₱ 10,000.00	₱ 120,000.00
D3	EMBANKMENT FROM EXCAVATED MATERIALS				
	Material Cost				
	Surplus Materials	243.11	cu.m	₱ 400.00	₱ 97,244.80
	Equipment				
	Plate Compactor	12.00	days	₱ 5,000.00	₱ 60,000.00
IV.	REINFORCING STEEL BARS				
A4.	ISOLATED FOOTING			**₱ 486.00**	
	Material Cost				
	20mm dia. Deformed Bar	296.00	kg	₱ 1,183.68	₱ 350,369.28
	16mm dia. Deformed Bar	190.00	kg	₱ 757.44	₱ 143,913.60
	#16 Tie Wire	2.00	roll	₱ 1,775.00	₱ 3,550.00
	14" Cut-Off Blade	5.00	each	₱ 395.00	₱ 1,975.00
B4.	FOOTING TIE BEAM			**₱ 770.00**	
	Material Cost				
	16mm dia. Deformed Bar	320.00	kg	₱ 757.44	₱ 242,380.80
	10mm dia. Deformed Bar	450.00	kg	₱ 295.68	₱ 133,056.00
	#16 Tie Wire	5.00	rolls	₱ 1,775.00	₱ 8,875.00
C4.	COLUMNS			**₱ 530.00**	
	Material Cost				
	20mm dia. Deformed Bar	150.00	kg	₱ 1,183.68	₱ 177,552.00
	16mm dia. Deformed Bar	140.00	kg	₱ 757.44	₱ 106,041.60
	10mm dia. Defi IX	240.00	kg	₱ 295.68	₱ 70,963.20
	#16 Tie Wire	5.00	rolls	₱ 1,775.00	₱ 8,875.00
	Equipment				
	Bar Cutter	90.00	days	₱ 1,500.00	₱ 135,000.00

D4.	GIRDERS		1327.00					
		Material Cost						
		20mm dia. Deformed Bar	584.00	kg	฿	1,183.68	฿	691,269.12
		16mm dia. Deformed Bar	198.00	kg	฿	757.44	฿	149,973.12
		10mm dia. Deformed Bar	545.00	kg	฿	295.68	฿	161,145.60
		#16 Tie Wire	6.00	rolls	฿	1,775.00	฿	10,650.00
		Equipment						
		Bar Cutter	21.00	days	฿	1,500.00	฿	31,500.00
E4.	SLAB		1522.00					
		Material Cost						
		10mm dia. Deformed Bar	1522.00	kg	฿	295.68	฿	450,024.96
		#16 Tie Wire	10.00	rolls	฿	1,775.00	฿	17,750.00
		Equipment						
		Bar Cutter	18.00	days	฿	1,500.00	฿	27,000.00
F4.	STAIRCASE		80.00					
		Material Cost						
		10mm dia. Deformed Bar	50.00	kg	฿	295.68	฿	14,784.00
		16mm dia. Deformed Bar	30.00	kg	฿	757.44	฿	22,723.20
		1x2x6 Tubular (Railings)	10.00	each	฿	1,580.00	฿	15,800.00
		Glass Clamps	30.00	each	฿	85.00	฿	2,550.00
		Equipment						
		Bar Cutter	12.00	days	฿	1,500.00	฿	18,000.00
V.	CONCRETE WORKS							
A5.	ISOLATED FOOTING							
		Material Cost						
		Portland Cement	307.00	bags	฿	245.00	฿	75,215.00
		3/4"-Aggregate	35.00	cu.m	฿	1,300.00	฿	45,500.00
		Washed Sand	17.50	cu.m	฿	1,000.00	฿	17,500.00
		Equipment						
		Transmit Mixer	6.00	days	฿	30,000.00	฿	180,000.00
B5.	FOOTING TIE BEAM							
		Material Cost						
		Portland Cement	302.00	bags	฿	245.00	฿	73,990.00
		3/4"-Aggregate	34.00	cu.m	฿	1,300.00	฿	44,200.00
		Washed Sand	17.00	cu.m	฿	1,000.00	฿	17,000.00
		Equipment						
		Transmit Mixer	8.00	days	฿	30,000.00	฿	240,000.00
C5.	COLUMNS							
		Material Cost						
		Portland Cement	398.00	bags	฿	245.00	฿	97,510.00
		3/4"-Aggregate	45.00	cu.m	฿	1,300.00	฿	58,500.00
		Washed Sand	22.50	cu.m	฿	1,000.00	฿	22,500.00
		Equipment						
		2 Transmit Mixer	14.00	days	฿	30,000.00	฿	840,000.00
D5.	GIRDERS							
		Material Cost						
		Portland Cement	360.00	bags	฿	245.00	฿	88,200.00
		3/4"-Aggregate	40.00	cu.m	฿	1,300.00	฿	52,000.00
		Washed Sand	20.00	cu.m	฿	1,000.00	฿	20,000.00
		Equipment						
		Transmit Mixer	6.00	days	฿	30,000.00	฿	180,000.00
E5.	SLAB							
		Material Cost						
		3000 psi - Ready Mix Concrete	121.32	cu.m	฿	2,500.00	฿	303,304.50
		Equipment						
		2 Transmit Mixer	6.00		฿	30,000.00	฿	360,000.00
F5.	STAIRCASE							
		Material Cost						
		Cement	30.00	Bags	฿	245.00	฿	7,350.00
		3/4 Gravel	3.00	Cu.m.	฿	1,300.00	฿	3,900.00
		Washed Sand	1.50	Cu.m.	฿	1,000.00	฿	1,500.00
		Tempered Glass	1.00	set	฿	150,000.00	฿	150,000.00
		Glass Clamps	30.00	each	฿	85.00	฿	2,550.00
		Wood Planks	21.00	each	฿	300.00	฿	6,300.00
		Epoxy Primer w/ Curing agent (4L)	1.00	can	฿	2,860.00	฿	2,860.00
		Epoxy Reducer (4L)	1.00	can	฿	741.00	฿	741.00
		Equipment						
		One Bagger Concrete Mixer	4.00	days	฿	5,000.00	฿	20,000.00

VI.	**MASONRY WORKS**					
A6	**CHB WALLS**					
	Material Cost					
	#4 CHB	5560.00	each	฿ 14.00	฿	77,840.00
	#6 CHB	7800.00	each	฿ 22.00	฿	171,600.00
	Portland Cement	4810.00	bags	฿ 245.00	฿	1,178,450.00
	Washed Sand	401.00	cu.m	฿ 1,000.00	฿	401,000.00
	10mm dia. Deformed Bar	448.00	each	฿ 295.68	฿	132,464.64
	#16 Tie Wire	3.00	rolls	฿ 1,775.00	฿	5,325.00
	Equipment					
	One Bagger Concrete Mixer	68.00	days	฿ 5,000.00	฿	340,000.00
B6	**FINISHING WORKS**					
	Material Cost					
	Portland Cement	407.00	bags	฿ 245.00	฿	99,715.00
	Washed Sand	42.75	cu.m	฿ 1,775.00	฿	75,884.80
	#40 Nylon String	10.00	rolls	฿ 42.00	฿	420.00
VII	**FORMWORKS AND SCAFFOLDINGS**					
A7	**FORMWORKS**					
	Material Cost					
	4' x 8' x 3/4" - Plywood	660.00	each	฿ 645.00	฿	425,700.00
	2" x 2" x 10' - Coco lumber	1980.00	each	฿ 100.00	฿	198,000.00
	2" x 3" x 10' - Coco lumber	374.00	each	฿ 180.00	฿	67,320.00
	#4 Common Nail	15.00	kgs	฿ 76.00	฿	1,140.00
	1-1/2" Common Nails	20.00	kgs	฿ 84.00	฿	1,680.00
	2" Concrete Nail	5.00	kgs	฿ 85.00	฿	425.00
	#40 Nylon String	10.00	rolls	฿ 42.00	฿	420.00
B7	**SCAFFOLDINGS**					
	Material Cost					
	1-1/4 : G.I pipe Sched. 40	110.00	each	฿ 1,165.00	฿	128,150.00
	Clamps	280.00	each	฿ 25.00	฿	7,000.00
VIII.	**ARCHITECTURAL WORKS**					
A8	**TILE WORKS**					
	Material Cost					
	0.60 x 0.60 Tile	822.00	each	฿ 250.00	฿	205,500.00
	Portland Cement	1973.00	bags	฿ 245.00	฿	483,385.00
	Washed Sand	164.40	cu.m	฿ 1,000.00	฿	164,400.00
	#40 Nylon String	3.00	rolls	฿ 75.00	฿	225.00
	Tile Adhesive	600.00	bags	฿ 240.00	฿	144,000.00
B8	**PAINTING WORKS**					
	Material Cost					
	Acrytex Primer 1705	342.00	liters	฿ 715.00	฿	244,530.00
	BOYSEN Acrytex Reducer #1750	321.00	liters	฿ 186.00	฿	59,706.00
IX.	**ROOFING WORKS**					
A9	**ROOF FRAMING**					
	Material Cost					
	40MM x 75MM x 6M C - purlins	185.00	each	฿ 314.00	฿	58,090.00
	150MM x 50MM x 1.2MM x 6M : Tubular	338.00	each	฿ 1,551.00	฿	524,238.00
	Blind Rivets : 1/2"	12.00	kgs	฿ 80.00	฿	960.00
	Welding rod 2.5MM E60	15.00	box	฿ 183.00	฿	2,745.00
	14" Cut-off Blade	5.00	pcs	฿ 395.00	฿	1,975.00
B9	**ROOF WORKS**					
	Material Cost					
	0.4MM thck Pre - Painted : Rib Type	512.00	m	฿ 394.00	฿	201,728.00
	3" - Self Tapping Tex - Screw	2000.00	each	฿ 2.20	฿	4,400.00
	Gutter	72.00	each	฿ 980.00	฿	70,560.00
	End Flashing	55.00	each	฿ 740.00	฿	40,700.00
	Fascia Cover	72.00	each	฿ 980.00	฿	70,560.00
	1" x 1" - Angle Bar	83.00	each	฿ 847.00	฿	70,301.00
	1/4" - Flat Bar	153.00	each	฿ 650.00	฿	99,450.00
	Welding rod 2.5MM E60	5.00	box	฿ 183.00	฿	915.00
X.	**OPENINGS**					
A10	**DOORS & WINDOWS**					
	Material Cost					
	Alluminum framed glass dooor (2.30m x 2.60m)	2.00	set	฿ 33,500.00	฿	67,000.00
	Solid core TKD door w/ glass (0.90m x 2.15m)	6.00	set	฿ 12,965.00	฿	77,790.00
	Flush type PVC door	4.00	set	฿ 2,658.00	฿	10,632.00
	Alluminum Framed Glass door (1.3.m x 2.60m)	3.00	set	฿ 22,646.00	฿	67,938.00
	Alluminum Framed Glass door w/ fixed glass (4.35m x 2.45m)	1.00	set	฿ 71,405.25	฿	71,405.25
	Alluminum Framed fixed window (2.45m x 7.45m)	1.00	set	฿ 122,291.75	฿	122,291.75
	Alluminum 2 awning fixed window (0.65m x 3.50m)	12.00	set	฿ 15,242.50	฿	182,910.00
	Alluminum 2 awning fixed window (0.45m x 3.25m)	6.00	set	฿ 9,798.75	฿	58,792.50
	Alluminum awning fixed window (1.35m x 3.25m)	1.00	set	฿ 29,396.25	฿	29,396.25
	Alluminum sliding/ fixed window (0.90m x 3.25m)	1.00	set	฿ 19,597.50	฿	19,597.50
	Alluminum sliding/ fixed window (0.60m x 0.60m)	4.00	set	฿ 2,412.00	฿	9,648.00
	Alluminum sliding/ fixed window (0.65m x 3.50m)	9.00	set	฿ 15,242.50	฿	137,182.50
	Alluminum sliding/ fixed window (0.65m x 3.50m)	4.00	set	฿ 15,242.50	฿	60,970.00
	Alluminum Framed fixed window (1.10m x 3.25m)	1.00	set	฿ 23,952.00	฿	23,952.00

XI.	ELECTRICAL							
		Material Cost						
		THHN #10 Stranded Wire (5.5mm²)	2.00	Box	₱	6,817.00	₱	13,634.00
		THHN #12 Stranded Wire (3.5mm²)	4.00	Box	₱	4,059.00	₱	16,236.00
		THHN #14 Stranded Wire (2.0mm²)	5.00	Box	₱	2,850.00	₱	14,250.00
		9" x 12" Panel board	1.00	each	₱	1,350.00	₱	1,350.00
		20 Amps circuit breaker	12.00	each	₱	998.00	₱	11,976.00
		100 Amps circuit breaker	1.00	each	₱	1,890.00	₱	1,890.00
		1 Gang Switches	7.00	each	₱	78.00	₱	546.00
		2 Gang Switches	2.00	each	₱	352.00	₱	704.00
		3 Gang Switches	5.00	each	₱	420.00	₱	2,100.00
		Junction Box	50.00	each	₱	45.00	₱	2,250.00
		Utility Boxes	80.00	each	₱	85.00	₱	6,800.00
		3 Gang duplex C. O.	65.00	each	₱	350.00	₱	22,750.00
		Flourecent lamp w/ Aluminum reflector (40w)	61.00	each	₱	1,090.00	₱	66,490.00
		Pin Light 2X26W/86 LAMP IP 55	27.00	each	₱	900.00	₱	24,300.00
		Electrical Tape	100.00	each	₱	155.00	₱	15,500.00
		1/2 Pcv Conduits	300.00	each	₱	448.00	₱	134,400.00
		Equipment						
		Minor Tools	19.00	days	₱	1,000.00	₱	19,000.00
XII.	PLUMBING							
		Material Cost						
		#2x6m uPVC series 1000 pipe	12.00	each	₱	538.00	₱	6,456.00
		#4x6m uPVC series 1000 pipe	8.00	each	₱	1,600.00	₱	12,800.00
		#2 90 deg. Elbow	20.00	each	₱	60.00	₱	1,200.00
		#2" P - Trap	13.00	each	₱	138.00	₱	1,794.00
		4X2 Wye Reducer	9.00	each	₱	185.00	₱	1,665.00
		#3/4x6m pvc blue	10.00	each	₱	120.00	₱	1,200.00
		#3/4 Elbow blue	5.00	each	₱	8.00	₱	40.00
		#1/2 Tee blue	10.00	each	₱	11.00	₱	110.00
		Stainless Faucet	3.00	each	₱	490.00	₱	1,470.00
		Lavatory including Fittings & Accessories	3.00	each	₱	1,665.00	₱	4,995.00
		4x4 Floor Drain	10.00	each	₱	195.00	₱	1,950.00
		Solvent cement (1L)	2.00	each	₱	180.00	₱	360.00
		Teflon Tape	5.00	each	₱	23.00	₱	115.00
		#4 Sanitary Tee w/ fittings	6.00	each	₱	133.00	₱	798.00
		Toilet W/ Accessories	5.00	set	₱	23,516.00	₱	117,580.00
		Urinal Bowl	3.00	each	₱	3,340.00	₱	10,020.00
		urinal flush valve	3.00	each	₱	936.00	₱	2,808.00
		Angle Valve	5.00	each	₱	300.00	₱	1,500.00
A8.	CATCH BASIN & SEPTIC TANK							
		Material Cost						
		Cement	45.00	Bags	₱	245.00	₱	11,025.00
		3/4 Gravel	5.00	Cu.m.	₱	1,300.00	₱	6,500.00
		Washed Sand	3.00	Cu.m.	₱	1,000.00	₱	3,000.00
		#4 CHB	400.00	each	₱	14.00	₱	5,600.00
		10mm dia. Deformed Bar	50.00	each	₱	295.68	₱	14,784.00
		12mm dia. Deformed Bar	10.00	each	₱	426.24	₱	4,262.40
		4" Series 1000 Sanitary uPVC pipe	2.00	each	₱	1,600.00	₱	3,200.00
		2" Series 1000 Sanitary uPVC pipe	5.00	each	₱	538.00	₱	2,690.00
		4"x4" Sanitary TEE	4.00	each	₱	256.00	₱	1,024.00
		4" C.O. Fittings	4.00	each	₱	120.00	₱	480.00
						TOTAL DIRECT COST		₱14,132,489.08

APPENDIX G

BILL OF QUANTITIES

Project Name:	**A Proposed Design of a Two-Storey Sangguniang Kabataan Building with Local Youth Development Council Office in Lambunao, Iloilo**
Location:	**Muncipality of Lambunao, Province of Iloilo**
Duration:	**210 days**

BILL OF QUANTITIES

Item No.	DESCRIPTION	Unit	Qty	Unit Cost	Total Amount
I.	**GENERAL REQUIREMENTS**				
A1.	PERMITS AND CLEARANCES	l.s.	1.00	30,000.00	**30,000.00**
B1.	PROJECT BILLBOARD / SIGNBOARD	ea.	2.00	13,490.00	**26,980.00**
C1.	OCCUPATIONAL SAFETY AND HEALTH PROGRAM	mos.	7.00	16,428.57	**115,000.00**
D1.	MOBILIZATION / DEMOBILIZATION	l.s.	1.00	200,000.00	**200,000.00**
II.	**TEMPORARY FACILITY FOR THE ENGINEERS**				
A1.	PROVISION OF THE OFFICE FACILITY FOR THE ENGINEER	lot	1.00	120,000.00	**120,000.00**
A2.	MAINTENANCE OF THE OFFICE FACILITY FOR THE ENGINEER	mos.	7.00	12,500.00	**87,500.00**
III.	**EARTHWORKS**				
A3.	CLEARING AND GRUBBING	lot	1.00	25,000.00	**25,000.00**
B3.	LAYOUTING AND STAKING	lot	1.00	28,920.00	**28,920.00**
C3	EXCAVATION	cu.m	324.15	498.19	**161,491.71**
D3	EMBANKMENT FROM EXCAVATED MATERIALS	cu.m	243.11	646.80	**157,244.80**
IV.	**REINFORCING STEEL BARS**				
A4.	ISOLATED FOOTING	kg	486.00	1,028.41	**499,807.88**
B4.	FOOTING TIE BEAMS	kg	770.00	499.11	**384,311.80**
C4.	COLUMNS	kg	530.00	940.44	**498,431.80**
D4.	GIRDERS	kg	1327.00	787.14	**1,044,537.84**
E4.	SLABS	kg	1522.00	325.08	**494,774.96**
F4.	STAIRCASE	kg	80.00	923.22	**73,857.60**
V.	**CONCRETE WORKS**				

A5.	ISOLATED FOOTING	cu.m	35.00	9,091.86	**318,215.00**
B5.	FOOTING TIE BEAMS	cu.m	34.00	11,035.00	**375,190.00**
C5.	COLUMNS	cu.m	45.00	22,633.56	**1,018,510.00**
D5.	GIRDERS	cu.m	40.00	8,505.00	**340,200.00**
E5.	SLABS	cu.m	121.32	5,467.32	**663,304.50**
F5.	STAIRCASE	cu.m	3.00	65,067.00	**195,201.00**
VI.	**MASONRY WORKS**				
A6.	CHB WALLS **With Reinforcement**	sq.m	1068.80	2,158.20	**2,306,679.64**
B6.	FINISHING WORKS	sq.m	2137.60	82.34	**176,019.80**
VII.	**FORMWORKS AND SCAFFOLDINGS**				
A7.	FORMWORKS	sq.m	1980.00	350.85	**694,685.00**
B7.	SCAFFOLDINGS	set	1.00	135,150.00	**135,150.00**
VIII.	**ARCHITECTURAL WORKS**				
A8.	TILE WORKS	sq.m	822.00	1,213.52	**997,510.00**
B8.	PAINTING WORKS	sq.m	2137.60	142.33	**304,236.00**
IX.	**ROOF WORKS**				
A9.	ROOF FRAMING	lot	1.00	588,008.00	**588,008.00**
B9.	ROOF WORKS	lot	1.00	558,614.00	**558,614.00**
X.	**OPENINGS**				
A10.	DOORS & WINDOWS	lot	1.00	939,505.75	**939,505.75**
XI.	**ELECTRICAL**				
	THHN #10 Stranded Wire (5.5mm²)	Box	2.00	6,817.00	**13,634.00**
	THHN #12 Stranded Wire (3.5mm²)	Box	4.00	4,059.00	**16,236.00**
	THHN #14 Stranded Wire (2.0mm²)	Box	5.00	2,850.00	**14,250.00**
	9” × 12” Panel board	each	1.00	1,350.00	**1,350.00**
	20 Amps circuit breaker	each	12.00	998.00	**11,976.00**
	100 Amps circuit breaker	each	1.00	1,890.00	**1,890.00**

	1 Gang Switches	each	7.00	78.00	**546.00**
	2 Gang Switches	each	2.00	352.00	**704.00**
	3 Gang Switches	each	5.00	420.00	**2,100.00**
	Junction Box	each	50.00	45.00	**2,250.00**
	Utility Boxes	each	80.00	85.00	**6,800.00**
	3 Gang duplex C. O.	each	65.00	350.00	**22,750.00**
	Flourecent lamp w/ Aluminum reflector (40w)	each	61.00	1,090.00	**66,490.00**
	Pin Light 2X26W/86 LAMP IP 55	each	27.00	900.00	**24,300.00**
	Electrical Tape	each	100.00	155.00	**15,500.00**
	1/2 PVC Conduits	each	300.00	448.00	**134,400.00**
	Minor Tools	days	19.00	1,000.00	**19,000.00**
XII.	**PLUMBING**				
	#2x6m uPVC series 1000 pipe	each	12.00	538.00	**6,456.00**
	#4x6m uPVC series 1000 pipe	each	8.00	1,600.00	**12,800.00**
	#2 90 deg. Elbow	each	20.00	60.00	**1,200.00**
	#2'' P - Trap	each	13.00	138.00	**1,794.00**
	4X2 Wye Reducer	each	9.00	185.00	**1,665.00**
	#3/4x6m pvc blue	each	10.00	120.00	**1,200.00**
	#3/4 Elbow blue	each	5.00	8.00	**40.00**
	#1/2 Tee blue	each	10.00	11.00	**110.00**
	Stainless Faucet	each	3.00	490.00	**1,470.00**
	Lavatory including Fittings & Accessories	each	3.00	1,665.00	**4,995.00**
	4x4 Floor Drain	each	10.00	195.00	**1,950.00**
	Solvent cement (1L)	each	2.00	180.00	**360.00**

	Teflon Tape	each	5.00	23.00	**115.00**
	#4 Sanitary Tee w/ fittings	each	6.00	133.00	**798.00**
	Toilet W/ Accessories	set	5.00	23,516.00	**117,580.00**
	Urinal Bowl	each	3.00	3,340.00	**10,020.00**
	Urinal flush valve	each	3.00	936.00	**2,808.00**
	Angle Valve	each	5.00	300.00	**1,500.00**
	Catch Basin and Septic Tank	lot	1.00	52,565.40	**52,565.40**
	Total Direct Cost:				**14,132,489.48**
	Overhead Expenses				1,130,599.16
	Contingencies and Miscellaneous				565,299.58
	Contractor's Profit Margin				1,413,248.95
	Value Added Tax (VAT)				706,624.47
	MATERIAL COST & OTHER EXPENSES				**17,948,261.64**
	LABOR COST			-	**4,239,746.84**
	TOTAL PROJECT COST				**22,188,008.49**
TWENTY TWO MILLION ONE HUNDRED THIRTY TWO THOUSAND FOUR HUNDRED EIGHTY NINE AND FORTY EIGHT CENTS					

APPENDIX H

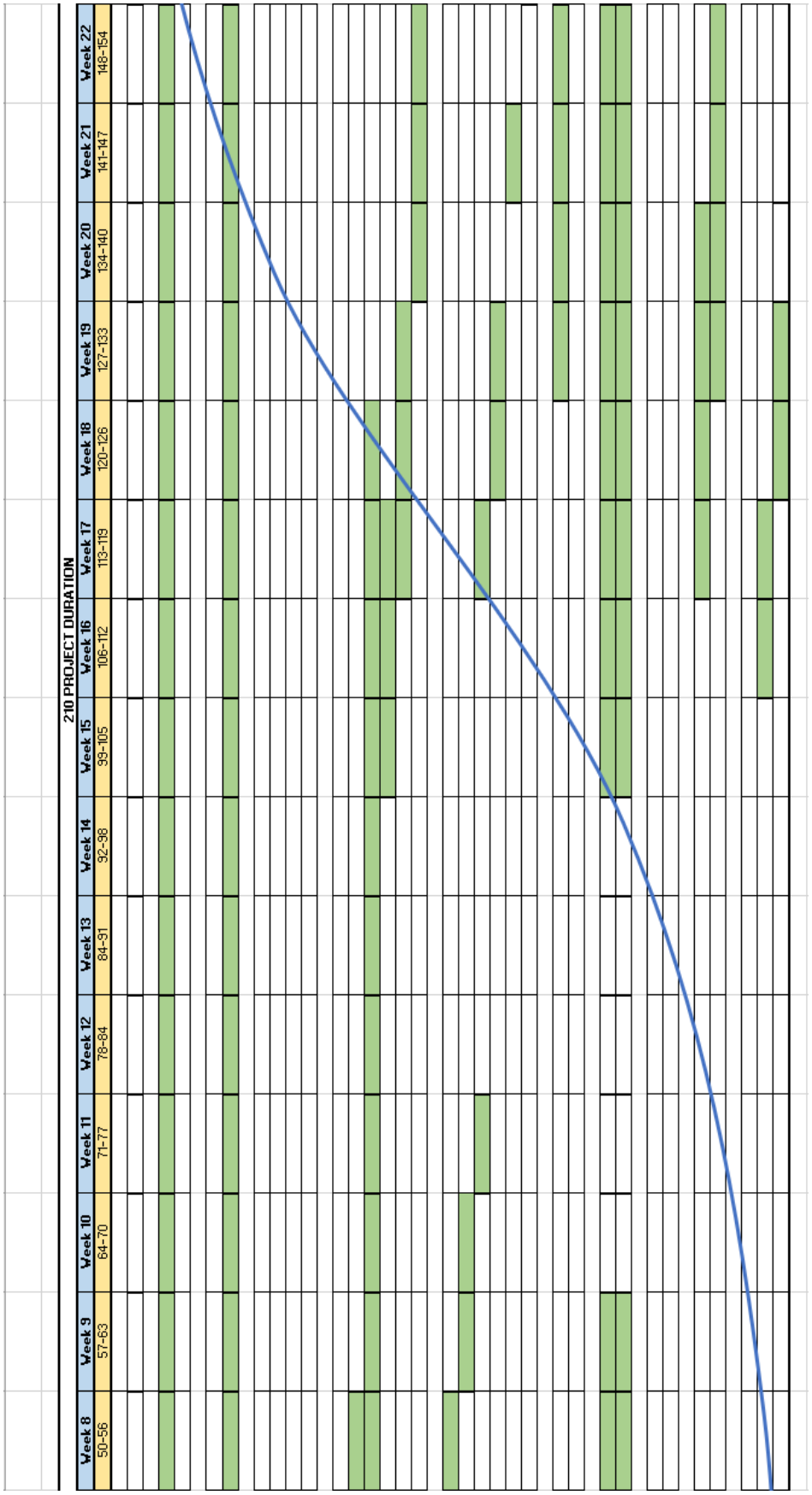
S-CURVE, PROJECT SCHEDULE, AND PERT – CPM

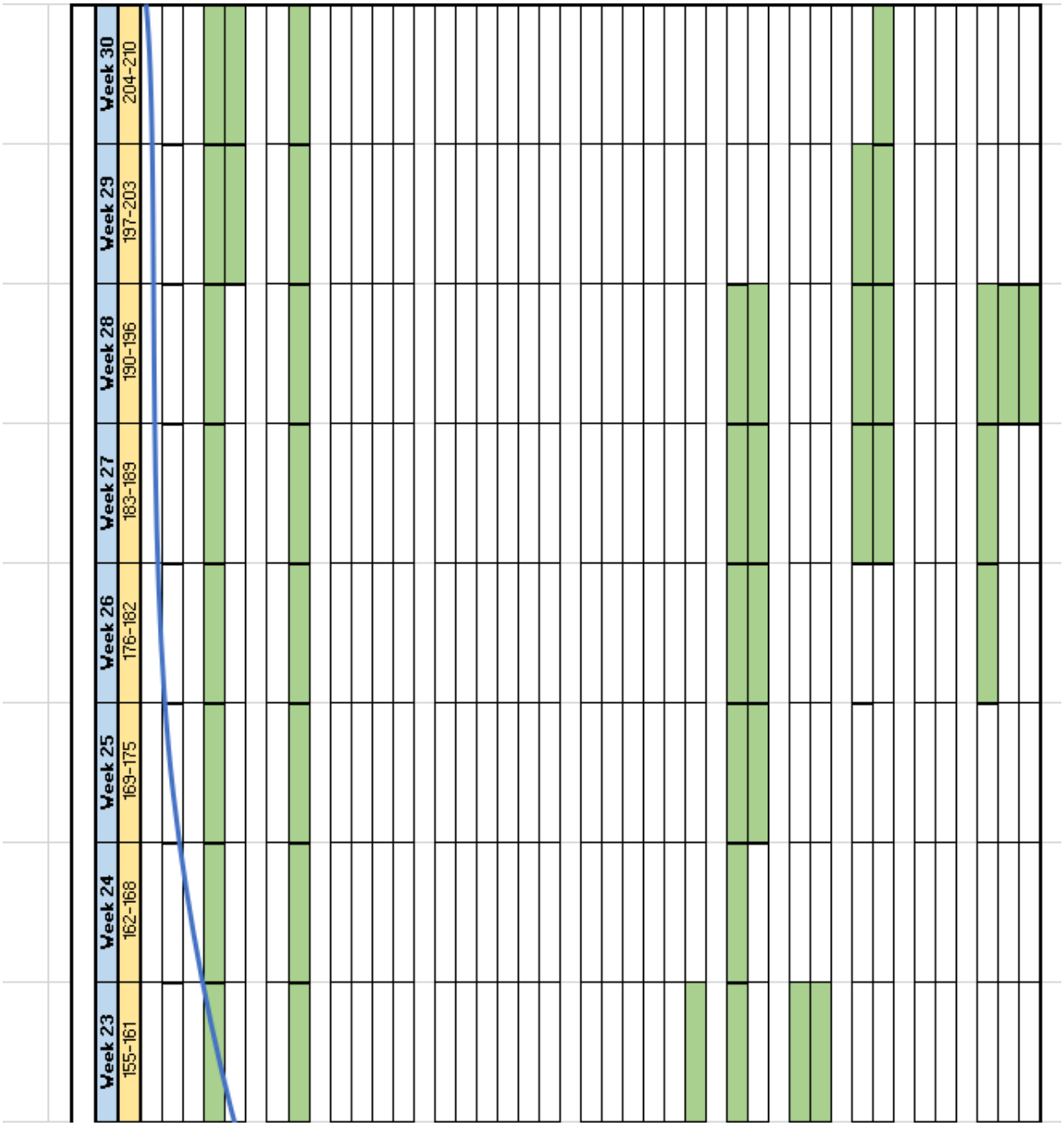
							Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Item No.	DESCRIPTION	Total Amount	%Wt.	Duration	Unit	Qty	1-7	8-14	15-21	22-28	29-35	36-42	43-49
I.	**GENERAL REQUIREMENTS**												
A1.	PERMITS AND CLEARANCES	30,000.00	0.135%	12.00	l.s	1.00							
B1.	PROJECT BILLBOARD / SIGNBOARD	26,980.00	0.122%	2.00	each	1.00							
C1.	OCCUPATIONAL SAFETY AND HEALTH PROGRAM	115,000.00	0.518%	210.00	l.s	1.00							
D1.	MOBILIZATION / DEMOBILIZATION	200,000.00	0.901%	12.00	l.s	1.00							
II.	**TEMPORARY FACILITY FOR THE ENGINEERS**												
A1.	PROVISION OF THE OFFICE FACILITY FOR THE	120,000.00	0.541%	196.00	lot	1.00							
A2.	MAINTENANCE OF THE OFFICE FACILITY FOR THE	87,500.00	0.394%	196.00	mos.	7.00							
III.	**EARTHWORKS**												
A3.	CLEARING AND GRUBBING	25,000.00	0.113%	12.00	lot	1.00							
B3.	LAYOUTING AND STAKING	28,920.00	0.130%	6.00	lot	1.00							
C3	EXCAVATION	161,491.71	0.728%	12.00	cu.m	324.15							
D3	EMBANKMENT FROM EXCAVATED MATERIALS	157,244.80	0.709%	12.00	cu.m	243.11							
IV.	**REINFORCING STEEL BARS**												
A4.	ISOLATED FOOTING	499,807.88	2.253%	21.00	kg	486.00							
B4.	FOOTING TIE BEAMS	384,311.80	1.732%	24.00	kg	770.00							
C4.	COLUMNS	498,431.80	2.246%	90.00	kg	530.00							
D4.	GIRDERS	1,044,537.84	4.708%	21.00	kg	1327.00							
E4.	SLABS	494,774.96	2.230%	18.00	kg	1522.00							
F4.	STAIRCASE	73,857.60	0.333%	18.00	kg	80.00							
V.	**CONCRETE WORKS**												
A5.	ISOLATED FOOTING	318,215.00	1.434%	6.00	cu.m	35.00							
B5.	FOOTING TIE BEAMS	375,190.00	1.691%	8.00	cu.m	34.00							
C5.	COLUMNS	1,018,510.00	4.590%	14.00	cu.m	45.00							
D5.	GIRDERS	340,200.00	1.533%	6.00	cu.m	40.00							
E5.	SLABS	663,304.50	2.989%	6.00	cu.m	121.32							
F5.	STAIRCASE	195,201.00	0.880%	4.00	cu.m	3.00							
VI.	**MASONRY WORKS**												
A6.	CHB WALLS	2,306,679.64	10.396%	68.00	sq.m	1068.80							
B6.	FINISHING WORKS	176,019.80	0.793%	24.00	sq.m	2137.60							
VII.	**FORMWORKS AND SCAFFOLDINGS**												
A7.	FORMWORKS	694,685.00	3.131%	75.00	sq.m	1964.88							
B7.	SCAFFOLDINGS	135,150.00	0.609%	75.00	set	1.00							
VIII.	**ARCHITECTURAL WORKS**												
A8.	TILE WORKS	997,510.00	4.496%	19.00	sq.m	822.00							
B8.	PAINTING WORKS	304,236.00	1.371%	25.00	sq.m	2137.60							
IX.	**ROOFING WORKS**												
A9.	ROOF FRAMING	588,008.00	2.650%	18.00	lot	1.00							
B9.	ROOF WORKS	558,614.00	2.518%	24.00	lot	1.00							
X.	**OPENINGS**												
A10.	DOORS & WINDOWS	939,505.75	4.234%	20.00	lot	1.00							
XI.	**ELECTRICAL**	354,176.00	1.596%	19.00	lot	1.00							
XII.	**PLUMBING**	219,426.40	0.989%	18.00	lot	1.00							
	Labor Cost and Other Expenses	8,055,519.00	36%	210.00									
	TOTAL:	**22,188,008.49**	**100%**										

Project Name: A Proposed Design of a Two-Storey Sangguniang Kabataan Building with Local Youth Development Council Office in Lambunao, Iloilo

Location: Muncipality of Lambunao, Province of Iloilo

Duration: 210 DAYS


210 PROJECT DURATION
Week 8
50-56
Week 9
57-63
Week 10
64-70
Week 11
71-77
Week 12
78-84
Week 13
84-91
Week 14
92-98
Week 15
99-105
Week 16
106-112
Week 17
113-119
Week 18
120-126
Week 19
127-133
Week 20
134-140
Week 21
141-147
Week 22
148-154


Week 23
155-161
Week 24
162-168
Week 25
169-175
Week 26
176-182
Week 27
183-189
Week 28
190-196
Week 29
197-203
Week 30
204-210

APPENDIX I STRUCTURAL ANALYSIS

LOAD DESIGNATION

2ND FLOOR

DEAD LOADS

Concrete fill finish	1.1 kPa
Slab self weight	3.54 kPa
Gypsum Board (12.5mm)	0.1 kPa
MEP	0.1 kPa
Suspended Steel Channel	0.1 kPa
Partition	1.9 kPa
Ceramic tile (20mm)	1.1 kPa

LIVE LOADS

Conference Hall	4.8 kPa

ROOF (TRUSSES)

DEAD LOADS

Gypsum Board (12.5mm)	0.1 kPa
MEP	0.1 KPa

LIVE LOADS

Roof (Flat)	1 kPa

ROOF DESIGN

STORIES (LEVELS)

Levels	Storey Height (m)
Footing to GF	2.103
GF to 2F	4
2F - Roof Beam	3.866
Roof Beam - Apex	1.1055
	11.0745

MEAN ROOF HEIGHT 8.9715 m

207E.5.2 Design Wind Pressures

Net design wind pressures, p_{net}, for component and cladding of buildings designed using the procedure specified herein represent the net pressures (sum of internal and external) that shall be applied normal to each building surface as shown in Figure 207E.5-1. p_{net} shall be determined by the following equation:

$$p_{net} = \lambda K_{zt} p_{net9} \qquad (207E.5\text{-}1)$$

where

λ = adjustment factor for building height and exposure from Figure 207E.5-1

K_{zt} = topographic factor as defined in Section 207A.8 evaluated at 0.33 mean roof height, $0.33h$

p_{net30} = net design wind pressure for Exposure B, at $h = 9$ m, from Figure 207E.5-1

User Note:

Part 2 of Section 207E is a simplified method to determine wind pressures on C&C of enclosed low-rise buildings having flat, gable or hip roof shapes. The provisions of Part 2 are based on the Envelope Procedure of Part 1 with wind pressures determined from a table and adjusted as appropriate.

Table 207E.5-1
Steps to Determine C&C
Wind Loads Enclosed Low-rise Buildings
(Simplified Method)

Step 1:	Determine risk category, see Table 103-1
Step 2:	Determine the basic wind speed, V, for the applicable risk category, see Figure 207A.5-1A, B or C
Step 3:	Determine wind load parameters: ➢ Exposure category B, C or D, see Section 207A.7 ➢ Topographic factor, K_{zt}, see Section 207A.8 and Figure 207A.8-1
Step 4:	Enter figure to determine wind pressures at $h = 9$ m., p_{net9}, see Figure 207E.5-1
Step 5:	Enter figure to determine adjustment for building height and exposure, λ, see Figure 207E.5-1
Step 6:	Determine adjusted wind pressures, p_{net}, see Equation 207E.5-1.

EXPOSURE B (Residential Structure in urban area)

250 KPH BASIC WIND SPEED

Adjustment Factor
for Building Height and Exposure, λ

Mean roof height (m)	Exposure		
	B	C	D
4.5	1.00	1.21	1.47
6.0	1.00	1.29	1.55
7.5	1.00	1.35	1.61
9.0	1.00	1.40	1.66
10.5	1.05	1.45	1.70
12.0	1.09	1.49	1.74
13.5	1.12	1.53	1.78
15.0	1.16	1.56	1.81
16.5	1.19	1.59	1.84
18.0	1.22	1.62	1.87

Figure 207E.5-1 (continued)
Design Wind Pressures on Walls and Roofs of Enclosed Buildings with $h \leq 18$ m
Components and Cladding

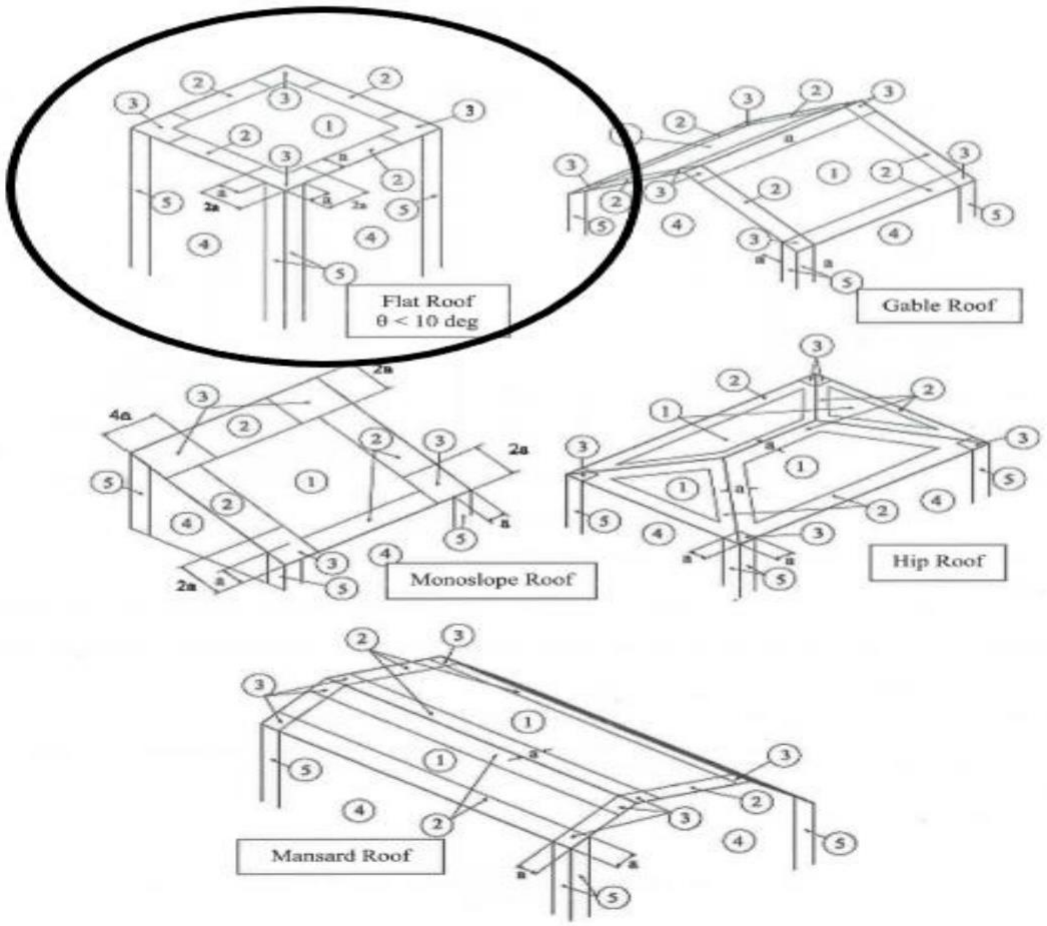


Figure 207E.7-2
C & C Zones C&C Wall and Roof Pressures, $h \leq 48$ m
Enclosed Buildings

Net Design Wind Pressure, p_{net} (kPa) (Exposure B at $h = 10$ m with $I = 1.0$ and $K_d = 1.0$)

	Zone	Effective wind area (sq. m.)	Basic Wind Speed V (kph)									
			150		200		250		300		350	
Roof 0 to 7 degrees	1	1.0	0.30	-0.75	0.54	-1.33	0.84	-2.08	1.22	-2.99	1.65	-4.07
	1	2.0	0.28	-0.73	0.51	-1.29	0.79	-2.02	1.14	-2.91	1.55	-3.96
	1	4.5	0.26	-0.70	0.46	-1.25	0.72	-1.95	1.04	-2.81	1.41	-3.83
	1	9.5	0.24	-0.68	0.43	-1.22	0.67	-1.90	0.96	-2.74	1.31	-3.72
	2	1.0	0.30	-1.25	0.54	-2.23	0.84	-3.48	1.22	-5.02	1.65	-6.83
	2	2.0	0.28	-1.12	0.51	-1.99	0.79	-3.11	1.14	-4.48	1.55	-6.10
	2	4.5	0.26	-0.94	0.46	-1.68	0.72	-2.62	1.04	-3.77	1.41	-5.14
	2	9.5	0.24	-0.81	0.43	-1.44	0.67	-2.25	0.96	-3.24	1.31	-4.41
	3	1.0	0.30	-1.89	0.54	-3.36	0.84	-5.25	1.22	-7.56	1.65	-10.29
	3	2.0	0.28	-1.56	0.51	-2.78	0.79	-4.34	1.14	-6.26	1.55	-8.52
	3	4.5	0.26	-1.14	0.46	-2.02	0.72	-3.16	1.04	-4.55	1.41	-6.19
	3	9.5	0.24	-0.81	0.43	-1.44	0.67	-2.25	0.96	-3.24	1.31	-4.41
Roof > 7 to 27 degrees	1	1.0	0.43	-0.68	0.77	-1.22	1.20	-1.90	1.72	-2.74	2.34	-3.72
	1	2.0	0.39	-0.66	0.70	-1.18	1.09	-1.85	1.57	-2.66	2.14	-3.62
	1	4.5	0.34	-0.64	0.61	-1.14	0.95	-1.78	1.37	-2.56	1.86	-3.48
	1	9.5	0.31	-0.62	0.55	-1.10	0.85	-1.72	1.23	-2.48	1.67	-3.38
	2	1.0	0.43	-1.19	0.77	-2.12	1.20	-3.32	1.72	-4.77	2.34	-6.50
	2	2.0	0.39	-1.10	0.70	-1.95	1.09	-3.04	1.57	-4.38	2.14	-5.96
	2	4.5	0.34	-0.97	0.61	-1.72	0.95	-2.69	1.37	-3.88	1.86	-5.27
	2	9.5	0.31	-0.88	0.55	-1.56	0.85	-2.44	1.23	-3.51	1.67	-4.77
	3	1.0	0.43	-1.76	0.77	-3.14	1.20	-4.90	1.72	-7.05	2.34	-9.60
	3	2.0	0.39	-1.65	0.70	-2.93	1.09	-4.57	1.57	-6.59	2.14	-8.96
	3	4.5	0.34	-1.49	0.61	-2.66	0.95	-4.15	1.37	-5.98	1.86	-8.14
	3	9.5	0.31	-1.38	0.55	-2.45	0.85	-3.83	1.23	-5.52	1.67	-7.52
Roof > 27 to 45 degrees	1	1.0	0.68	-0.75	1.22	-1.33	1.90	-2.08	2.74	-3.00	3.72	-4.09
	1	2.0	0.66	-0.71	1.18	-1.27	1.85	-1.98	2.66	-2.85	3.62	-3.88
	1	4.5	0.64	-0.66	1.14	-1.17	1.78	-1.83	2.56	-2.63	3.48	-3.59
	1	9.5	0.62	-0.62	1.10	-1.10	1.72	-1.72	2.48	-2.48	3.38	-3.38
	2	1.0	0.68	-0.88	1.22	-1.56	1.90	-2.44	2.74	-3.51	3.72	-4.77
	2	2.0	0.66	-0.84	1.18	-1.49	1.85	-2.32	2.66	-3.34	3.62	-4.55
	2	4.5	0.64	-0.79	1.14	-1.40	1.78	-2.18	2.56	-3.14	3.48	-4.27
	2	9.5	0.62	-0.75	1.10	-1.33	1.72	-2.08	2.48	-3.00	3.38	-4.09
	3	1.0	0.68	-0.88	1.22	-1.56	1.90	-2.44	2.74	-3.51	3.72	-4.77
	3	2.0	0.66	-0.84	1.18	-1.49	1.85	-2.32	2.66	-3.34	3.62	-4.55
	3	4.5	0.64	-0.79	1.14	-1.40	1.78	-2.18	2.56	-3.14	3.48	-4.27
	3	9.5	0.62	-0.75	1.10	-1.33	1.72	-2.08	2.48	-3.00	3.38	-4.09
Wall	4	1.0	0.75	-0.81	1.33	-1.44	2.08	-2.25	2.99	-3.24	4.07	-4.41
	4	2.0	0.72	-0.78	1.27	-1.38	1.99	-2.16	2.86	-3.12	3.90	-4.24
	4	4.5	0.67	-0.73	1.19	-1.30	1.86	-2.03	2.68	-2.93	3.65	-3.98
	4	9.5	0.64	-0.70	1.13	-1.24	1.77	-1.94	2.55	-2.80	3.46	-3.81
	4	46.5	0.56	-0.62	0.99	-1.10	1.55	-1.72	2.23	-2.48	3.03	-3.38
	5	1.0	0.75	-1.00	1.33	-1.78	2.08	-2.78	2.99	-4.00	4.07	-5.45
	5	2.0	0.72	-0.94	1.27	-1.67	1.99	-2.60	2.86	-3.75	3.90	-5.10
	5	4.5	0.67	-0.85	1.19	-1.50	1.86	-2.35	2.68	-3.38	3.65	-4.60
	5	9.5	0.64	-0.78	1.13	-1.38	1.77	-2.15	2.55	-3.10	3.46	-4.22
	5	46.5	0.56	-0.62	0.99	-1.10	1.55	-1.72	2.23	-2.48	3.03	-3.38

*Note: For effective areas between those given **above** the load may be interpolated, otherwise use the **load** associated with the lower effective area. The final value, including all permitted reductions, used in the design shall not be less than that required by Section 207E.2.2.*

Figure 207E.5-1 (continued)
Design Wind Pressures on Walls and Roofs of Enclosed Buildings with $h \leq 18$ m
Components and Cladding

PURLINS (EFFECTIVE AREA) 4.78 m2

Zone			
1	2	3	
0.72	0.72	0.72	kn/m2
-1.95	-2.62	-3.16	kn/m2

PURLIN SPACING 2 M

WIND LOAD 1	1.44		1.44	1.44	kn/m
WIND LOAD 2	-3.9		-5.24	-6.32	kn/m
DEAD LOADS	(ROOFING SHEET x PURLIN SPACING)				0.2 kN/m
	SELF WEIGHT				1 kN/m
LIVE LOAD	(ROOF (FLAT) x PURLIN SPACING)				2 kN/m

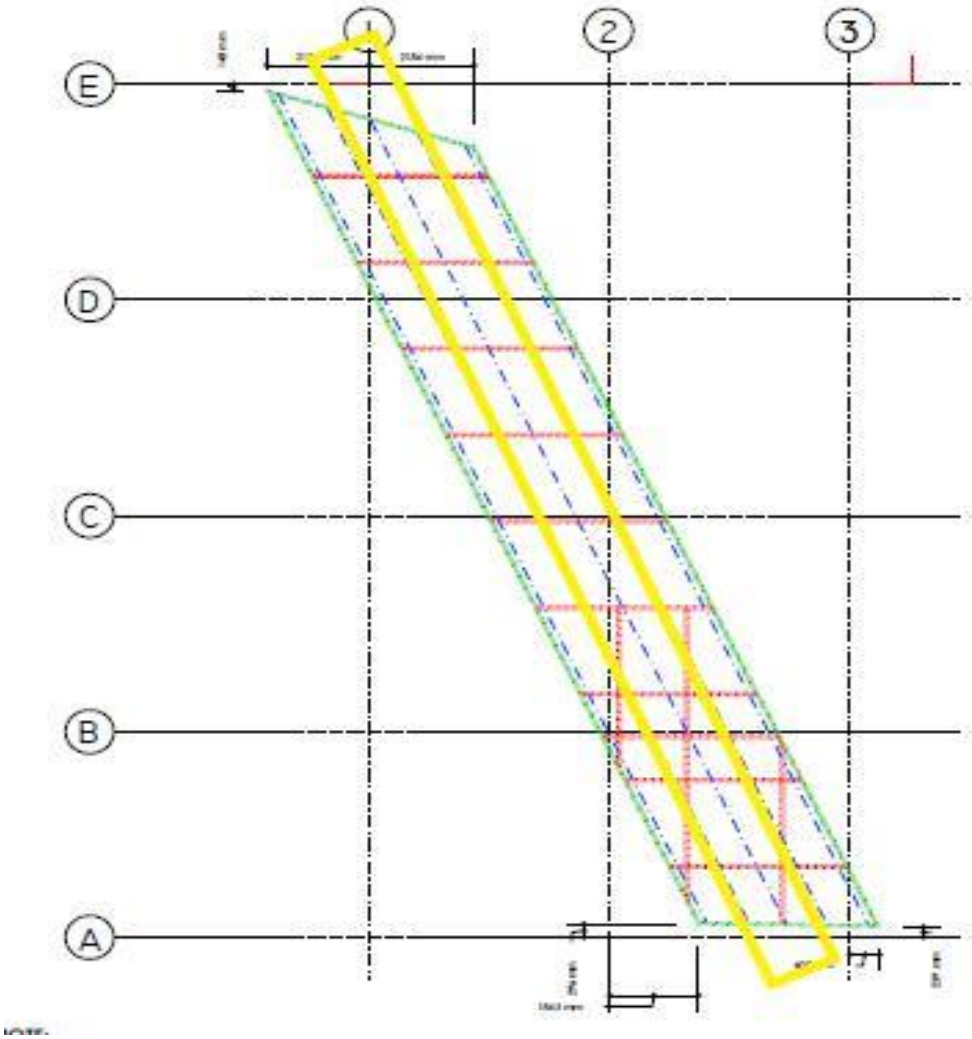
TRUSS (EFFECTIVE AREA)

Zone			
1	2	3	
0.67	0.67	0.67	kn/m2
-1.9	-2.25	-2.25	kn/m2

TRUSS SPACING 0.8 M

WIND LOAD 1	0.54		0.54	0.54	kn/m
WIND LOAD 2	-1.52		-1.8	-1.8	kn/m
DEAD LOADS	(ROOFING SHEET x PURLIN SPACING + WT. OF PURLINS)				0.488 kN/m
	SELF WEIGHT				1 kN/m
LIVE LOAD	(ROOF (FLAT) x PURLIN SPACING)				0.8 kN/m

PURLINS ANALYSIS



Section Properties

Prop	Section	Area (cm^2)	I_{yy} (cm^4)	I_{zz} (cm^4)	J (cm^4)	Material
1	C8X11 D SP 0.00	43.484	226.323	2.71E+3	9.689	STEEL

Combination Load Cases

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
5	1.2DL + 0.5LL + 1.0WL1	1	DL	1.20
		2	LL	0.55
		3	WL1	1.00
6	1.2DL + 0.5LL + 1.0WL2	1	DL	1.20
		2	LL	0.50
		4	WL2	1.00
7	0.9DL + 1.0WL1	1	DL	0.90
		3	WL1	1.00
8	0.9DL + 1.0WL2	1	DL	0.90
		4	WL2	1.00

1 DL : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
1	UNI	kN/m	GY	-0.200	-	-	-	-
2	UNI	kN/m	GY	-0.200	-	-	-	-
3	UNI	kN/m	GY	-0.200	-	-	-	-
4	UNI	kN/m	GY	-0.200	-	-	-	-
5	UNI	kN/m	GY	-0.200	-	-	-	-
6	UNI	kN/m	GY	-0.200	-	-	-	-

1 DL : Selfweight

Direction	Factor	Assigned Geometry
Y	-1.000	ALL

2 LL : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
1	UNI	kN/m	GY	-2.000	-	-	-	-
2	UNI	kN/m	GY	-2.000	-	-	-	-
3	UNI	kN/m	GY	-2.000	-	-	-	-
4	UNI	kN/m	GY	-2.000	-	-	-	-
5	UNI	kN/m	GY	-2.000	-	-	-	-
6	UNI	kN/m	GY	-2.000	-	-	-	-

3 WL1 : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
1	UNI	kN/m	GY	-1.440	-	-	-	-
2	UNI	kN/m	GY	-1.440	-	-	-	-
3	UNI	kN/m	GY	-1.440	-	-	-	-
4	UNI	kN/m	GY	-1.440	-	-	-	-
5	UNI	kN/m	GY	-1.440	-	-	-	-
6	UNI	kN/m	GY	-1.440	-	-	-	-

4 WL2 : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
1	UNI	kN/m	GY	5.240	-	-	-	-
2	UNI	kN/m	GY	3.900	-	-	-	-
3	UNI	kN/m	GY	3.900	-	-	-	-
4	UNI	kN/m	GY	5.240	-	-	-	-
5	UNI	kN/m	GY	6.320	-	-	-	-
6	UNI	kN/m	GY	6.320	-	-	-	-

Utilization Ratio

Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (cm^2)	Iz (cm^4)	Iy (cm^4)	Ix (cm^4)
1	C8X11 D SP	C8X11 D SP	0.008	1.000	0.008	Cl.G1	8	43.484	2.71E+3	200.841	10.042
2	C8X11 D SP	C8X11 D SP	0.005	1.000	0.005	Cl.G1	8	43.484	2.71E+3	200.841	10.042
3	C8X11 D SP	C8X11 D SP	0.005	1.000	0.005	Cl.G1	8	43.484	2.71E+3	200.841	10.042
4	C8X11 D SP	C8X11 D SP	0.008	1.000	0.008	Cl.G1	8	43.484	2.71E+3	200.841	10.042
5	C8X11 D SP	C8X11 D SP	0.003	1.000	0.003	Cl.G1	8	43.484	2.71E+3	200.841	10.042
6	C8X11 D SP	C8X11 D SP	0.002	1.000	0.002	Cl.G1	8	43.484	2.71E+3	200.841	10.042

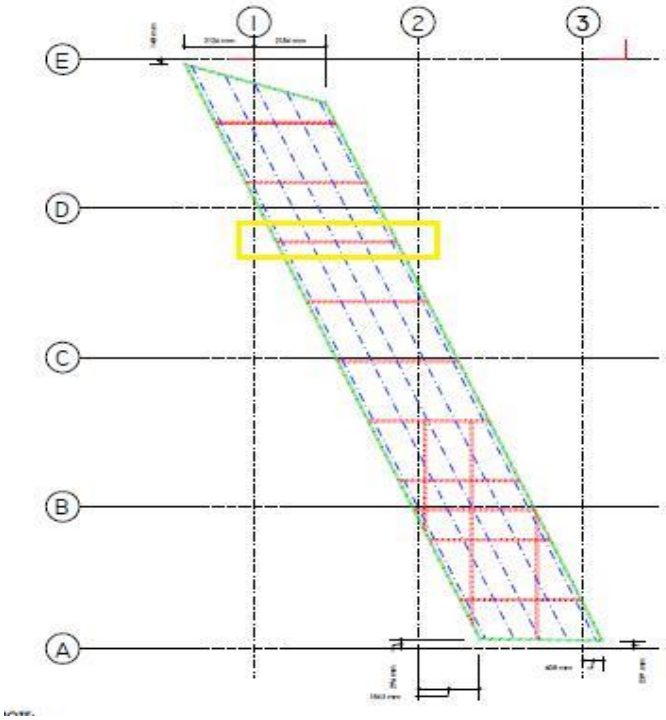
Statics Check Results

L/C		FX (kN)	FY (kN)	FZ (kN)	MX (kN-m)	MY (kN-m)	MZ (kN-m)
1:DL	Loads	0	-1.923	0	0	0	-3.461
1:DL	Reactions	0	1.923	0	0	0	3.461
	Difference	0	0	0	0	0	-0.000
2:LL	Loads	0	-7.200	0	0	0	-12.960
2:LL	Reactions	0	7.200	0	0	0	12.960
	Difference	0	0	0	0	0	-0.000
3:WL1	Loads	0	-5.184	0	0	0	-9.331
3:WL1	Reactions	0	5.184	0	0	0	9.331
	Difference	0	0	0	0	0	-0.000
4:WL2	Loads	0	16.979	0	0	0	30.490
4:WL2	Reactions	0	-16.979	0	0	0	-30.490
	Difference	0	0	0	0	0	0.000

Failed Members

There is no data of this type.

TRUSS ANALYSIS

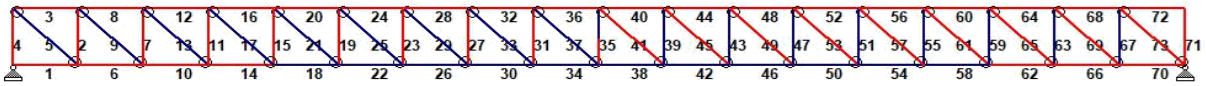


Section Properties

Prop	Section	Area (cm^2)	I_{yy} (cm^4)	I_{zz} (cm^4)	J (cm^4)	Material
1	L20204	6.090	22.872	6.064	0.840	STEEL_ANGLI

Combination Load Cases

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
5	1.2DL + 0.5LL + 1WL1	1	DL	1.20
		2	LL	0.50
		3	WL1	1.00
6	1.2DL + 0.5LL + 1WL2	1	DL	1.20
		2	LL	0.50
		4	WL2	1.00
7	0.9DL + 1WL1	1	DL	0.90
		3	WL1	1.00
8	0.9DL + 1.0WL2	1	DL	0.90
		4	WL2	1.00



COMPRESSION MEMBERS
TENSION MEMBERS

1 DL : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
1	UNI	kN/m	GY	-0.488	-	-	-	-
6	UNI	kN/m	GY	-0.488	-	-	-	-
10	UNI	kN/m	GY	-0.488	-	-	-	-
14	UNI	kN/m	GY	-0.488	-	-	-	-
18	UNI	kN/m	GY	-0.488	-	-	-	-
22	UNI	kN/m	GY	-0.488	-	-	-	-
26	UNI	kN/m	GY	-0.488	-	-	-	-
30	UNI	kN/m	GY	-0.488	-	-	-	-
34	UNI	kN/m	GY	-0.488	-	-	-	-
38	UNI	kN/m	GY	-0.488	-	-	-	-
42	UNI	kN/m	GY	-0.488	-	-	-	-
46	UNI	kN/m	GY	-0.488	-	-	-	-
50	UNI	kN/m	GY	-0.488	-	-	-	-
54	UNI	kN/m	GY	-0.488	-	-	-	-
58	UNI	kN/m	GY	-0.488	-	-	-	-
62	UNI	kN/m	GY	-0.488	-	-	-	-
66	UNI	kN/m	GY	-0.488	-	-	-	-
70	UNI	kN/m	GY	-0.488	-	-	-	-

1 DL : Selfweight

Direction	Factor	Assigned Geometry
Y	-1.000	ALL

2 LL : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
3	UNI	kN/m	GY	-0.800	-	-	-	-
8	UNI	kN/m	GY	-0.800	-	-	-	-

12	UNI	kN/m	GY	-0.800	-	-	-	-
16	UNI	kN/m	GY	-0.800	-	-	-	-
20	UNI	kN/m	GY	-0.800	-	-	-	-
24	UNI	kN/m	GY	-0.800	-	-	-	-
28	UNI	kN/m	GY	-0.800	-	-	-	-
32	UNI	kN/m	GY	-0.800	-	-	-	-
36	UNI	kN/m	GY	-0.800	-	-	-	-
40	UNI	kN/m	GY	-0.800	-	-	-	-
44	UNI	kN/m	GY	-0.800	-	-	-	-
48	UNI	kN/m	GY	-0.800	-	-	-	-
52	UNI	kN/m	GY	-0.800	-	-	-	-
56	UNI	kN/m	GY	-0.800	-	-	-	-
60	UNI	kN/m	GY	-0.800	-	-	-	-
64	UNI	kN/m	GY	-0.800	-	-	-	-
68	UNI	kN/m	GY	-0.800	-	-	-	-
72	UNI	kN/m	GY	-0.800	-	-	-	-

3 WL1 : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
3	UNI	kN/m	GY	-0.540	-	-	-	-
8	UNI	kN/m	GY	-0.540	-	-	-	-
12	UNI	kN/m	GY	-0.540	-	-	-	-
16	UNI	kN/m	GY	-0.540	-	-	-	-
20	UNI	kN/m	GY	-0.540	-	-	-	-
24	UNI	kN/m	GY	-0.540	-	-	-	-
28	UNI	kN/m	GY	-0.540	-	-	-	-
32	UNI	kN/m	GY	-0.540	-	-	-	-
36	UNI	kN/m	GY	-0.540	-	-	-	-
40	UNI	kN/m	GY	-0.540	-	-	-	-
44	UNI	kN/m	GY	-0.540	-	-	-	-
48	UNI	kN/m	GY	-0.540	-	-	-	-
52	UNI	kN/m	GY	-0.540	-	-	-	-
56	UNI	kN/m	GY	-0.540	-	-	-	-
60	UNI	kN/m	GY	-0.540	-	-	-	-
64	UNI	kN/m	GY	-0.540	-	-	-	-
68	UNI	kN/m	GY	-0.540	-	-	-	-
72	UNI	kN/m	GY	-0.540	-	-	-	-

4 WL2 : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
3	UNI	kN/m	GY	1.520	-	-	-	-
8	UNI	kN/m	GY	1.520	-	-	-	-
12	UNI	kN/m	GY	1.800	-	-	-	-
16	UNI	kN/m	GY	1.800	-	-	-	-
20	UNI	kN/m	GY	1.800	-	-	-	-
24	UNI	kN/m	GY	1.800	-	-	-	-
28	UNI	kN/m	GY	1.800	-	-	-	-
32	UNI	kN/m	GY	1.800	-	-	-	-
36	UNI	kN/m	GY	1.800	-	-	-	-
40	UNI	kN/m	GY	1.800	-	-	-	-

40	UNI	kN/m	GY	1.800	-	-	-	-
44	UNI	kN/m	GY	1.800	-	-	-	-
48	UNI	kN/m	GY	1.800	-	-	-	-
52	UNI	kN/m	GY	1.800	-	-	-	-
56	UNI	kN/m	GY	1.800	-	-	-	-
60	UNI	kN/m	GY	1.800	-	-	-	-
64	UNI	kN/m	GY	1.800	-	-	-	-
68	UNI	kN/m	GY	1.520	-	-	-	-
72	UNI	kN/m	GY	1.520	-	-	-	-

Utilization Ratio

Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (cm^2)	Iz (cm^4)	Iy (cm^4)	Ix (cm^4)
1	L20204	L20204	0.138	1.000	0.138	Eq.H2-1	5	6.090	5.885	23.052	0.819
2	L20204	L20204	0.062	1.000	0.062	Eq.H2-1	5	6.090	5.885	23.052	0.819
3	L20204	L20204	0.064	1.000	0.064	Eq.H2-1	5	6.090	5.885	23.052	0.819
4	L20204	L20204	0.064	1.000	0.064	Eq.H2-1	5	6.090	5.885	23.052	0.819
5	L20204	L20204	0.045	1.000	0.045	Eq.H2-1	5	6.090	5.885	23.052	0.819
6	L20204	L20204	0.095	1.000	0.095	Eq.H2-1	5	6.090	5.885	23.052	0.819
7	L20204	L20204	0.055	1.000	0.055	Eq.H2-1	5	6.090	5.885	23.052	0.819
8	L20204	L20204	0.089	1.000	0.089	Eq.H2-1	5	6.090	5.885	23.052	0.819
9	L20204	L20204	0.040	1.000	0.040	Eq.H2-1	5	6.090	5.885	23.052	0.819
10	L20204	L20204	0.061	1.000	0.061	Eq.H2-1	5	6.090	5.885	23.052	0.819
11	L20204	L20204	0.048	1.000	0.048	Eq.H2-1	5	6.090	5.885	23.052	0.819
12	L20204	L20204	0.111	1.000	0.111	Eq.H2-1	5	6.090	5.885	23.052	0.819
13	L20204	L20204	0.035	1.000	0.035	Eq.H2-1	5	6.090	5.885	23.052	0.819
14	L20204	L20204	0.031	1.000	0.031	Eq.H2-1	5	6.090	5.885	23.052	0.819
15	L20204	L20204	0.042	1.000	0.042	Eq.H2-1	5	6.090	5.885	23.052	0.819
16	L20204	L20204	0.130	1.000	0.130	Eq.H2-1	5	6.090	5.885	23.052	0.819
17	L20204	L20204	0.030	1.000	0.030	Eq.H2-1	5	6.090	5.885	23.052	0.819
18	L20204	L20204	0.019	1.000	0.019	Eq.H2-1	8	6.090	5.885	23.052	0.819
19	L20204	L20204	0.035	1.000	0.035	Eq.H2-1	5	6.090	5.885	23.052	0.819
20	L20204	L20204	0.145	1.000	0.145	Eq.H2-1	5	6.090	5.885	23.052	0.819
21	L20204	L20204	24453	1.000	0.024453	Eq.H2-1	5	6.090	5.885	23.052	0.819
22	L20204	L20204	0.036	1.000	0.036	Eq.H2-1	5	6.090	5.885	23.052	0.819
23	L20204	L20204	0.028	1.000	0.028	Eq.H2-1	5	6.090	5.885	23.052	0.819
24	L20204	L20204	0.157	1.000	0.157	Eq.H2-1	5	6.090	5.885	23.052	0.819
25	L20204	L20204	0.019	1.000	0.019	Eq.H2-1	5	6.090	5.885	23.052	0.819
26	L20204	L20204	04946	1.000	0.04946	Eq.H2-1	5	6.090	5.885	23.052	0.819
27	L20204	L20204	0.022	1.000	0.022	Eq.H2-1	5	6.090	5.885	23.052	0.819
28	L20204	L20204	0.164	1.000	0.164	Eq.H2-1	5	6.090	5.885	23.052	0.819
29	L20204	L20204	0.014	1.000	0.014	Eq.H2-1	5	6.090	5.885	23.052	0.819
30	L20204	L20204	0.059	1.000	0.059	Eq.H2-1	5	6.090	5.885	23.052	0.819
31	L20204	L20204	0.015	1.000	0.015	Eq.H2-1	5	6.090	5.885	23.052	0.819
32	L20204	L20204	0.168	1.000	0.168	Eq.H2-1	5	6.090	5.885	23.052	0.819
33	L20204	L20204	0.008	1.000	0.008	Eq.H2-1	5	6.090	5.885	23.052	0.819
34	L20204	L20204	0.065	1.000	0.065	Eq.H2-1	5	6.090	5.885	23.052	0.819
35	L20204	L20204	0.009	1.000	0.009	Cl.F10.1	5	6.090	5.885	23.052	0.819
36	L20204	L20204	0.169	1.000	0.169	Eq.H2-1	5	6.090	5.885	23.052	0.819
37	L20204	L20204	0.003	1.000	0.003	Eq.H2-1	5	6.090	5.885	23.052	0.819
38	L20204	L20204	66105	1.000	0.066105	Eq.H2-1	5	6.090	5.885	23.052	0.819
39	L20204	L20204	0.010	1.000	0.010	Eq.H2-1	5	6.090	5.885	23.052	0.819
40	L20204	L20204	0.165	1.000	0.165	Eq.H2-1	5	6.090	5.885	23.052	0.819
41	L20204	L20204	0.004	1.000	0.004	Cl.E3	5	6.090	5.885	23.052	0.819
42	L20204	L20204	0.063	1.000	0.063	Eq.H2-1	5	6.090	5.885	23.052	0.819
43	L20204	L20204	I11131	1.000	0.011131	Eq.H2-1	5	6.090	5.885	23.052	0.819
44	L20204	L20204	0.158	1.000	0.158	Eq.H2-1	5	6.090	5.885	23.052	0.819
45	L20204	L20204	0.009	1.000	0.009	Cl.E3	5	6.090	5.885	23.052	0.819
46	L20204	L20204	0.057	1.000	0.057	Eq.H2-1	5	6.090	5.885	23.052	0.819
47	L20204	L20204	0.012	1.000	0.012	Eq.H2-1	5	6.090	5.885	23.052	0.819
48	L20204	L20204	0.148	1.000	0.148	Cl.E3	5	6.090	5.885	23.052	0.819
49	L20204	L20204	0.015	1.000	0.015	Cl.E3	5	6.090	5.885	23.052	0.819
50	L20204	L20204	0.046	1.000	0.046	Eq.H2-1	5	6.090	5.885	23.052	0.819
51	L20204	L20204	0.017	1.000	0.017	Eq.H2-1	5	6.090	5.885	23.052	0.819
52	L20204	L20204	0.134	1.000	0.134	Eq.H2-1	5	6.090	5.885	23.052	0.819
53	L20204	L20204	0.021	1.000	0.021	Cl.E3	5	6.090	5.885	23.052	0.819

54	L20204	L20204	03085	1.000	0.03085	Eq.H2-1	5	6.090	5.885	23.052	0.819
55	L20204	L20204	0.024	1.000	0.024	Eq.H2-1	5	6.090	5.885	23.052	0.819
56	L20204	L20204	0.119	1.000	0.119	Eq.H2-1	5	6.090	5.885	23.052	0.819
57	L20204	L20204	0.027	1.000	0.027	Cl.E3	5	6.090	5.885	23.052	0.819
58	L20204	L20204	0.012	1.000	0.012	Eq.H2-1	8	6.090	5.885	23.052	0.819
59	L20204	L20204	0.030	1.000	0.030	Eq.H2-1	5	6.090	5.885	23.052	0.819
60	L20204	L20204	0.100	1.000	0.100	Eq.H2-1	5	6.090	5.885	23.052	0.819
61	L20204	L20204	32971	1.000	0.032971	Cl.E3	5	6.090	5.885	23.052	0.819
62	L20204	L20204	0.027	1.000	0.027	Eq.H2-1	5	6.090	5.885	23.052	0.819
63	L20204	L20204	0.037	1.000	0.037	Eq.H2-1	5	6.090	5.885	23.052	0.819
64	L20204	L20204	0.077	1.000	0.077	Eq.H2-1	5	6.090	5.885	23.052	0.819
65	L20204	L20204	0.039	1.000	0.039	Cl.E3	5	6.090	5.885	23.052	0.819
66	L20204	L20204	0.057	1.000	0.057	Eq.H2-1	5	6.090	5.885	23.052	0.819
67	L20204	L20204	0.040	1.000	0.040	Eq.H2-1	5	6.090	5.885	23.052	0.819
68	L20204	L20204	0.053	1.000	0.053	Eq.H2-1	5	6.090	5.885	23.052	0.819
69	L20204	L20204	0.045	1.000	0.045	Cl.E3	5	6.090	5.885	23.052	0.819
70	L20204	L20204	0.091	1.000	0.091	Eq.H2-1	5	6.090	5.885	23.052	0.819
71	L20204	L20204	0.017	1.000	0.017	Eq.H2-1	5	6.090	5.885	23.052	0.819
72	L20204	L20204	0.015	1.000	0.015	Eq.H2-1	5	6.090	5.885	23.052	0.819
73	L20204	L20204	0.051	1.000	0.051	Cl.E3	5	6.090	5.885	23.052	0.819

Statics Check Results

L/C		FX (kN)	FY (kN)	FZ (kN)	MX (kN·m)	MY (kN·m)	MZ (kN·m)
1:DL	Loads	-0.000	-3.764	0	0	0	-10.164
1:DL	Reactions	0.000	3.764	0	0	0	10.164
	Difference	-0.000	0.000	0	0	0	0.000
2:LL	Loads	0	-4.320	0	0	0	-11.664
2:LL	Reactions	-0.000	4.320	0	0	0	11.664
	Difference	-0.000	0.000	0	0	0	0.000
3:WL1	Loads	0	-2.916	0	0	0	-7.873
3:WL1	Reactions	-0.000	2.916	0	0	0	7.873
	Difference	-0.000	0.000	0	0	0	0.000
4:WL2	Loads	0	9.384	0	0	0	25.337
4:WL2	Reactions	0.000	-9.384	0	0	0	-25.337
	Difference	0.000	-0.000	0	0	0	-0.000

Failed Members

There is no data of this type.

DESIGN WIND LOAD

Table 207E.6-1
Steps to Determine C&C Wind Loads
Enclosed and Partially Enclosed
Building with $h > 18$ m

Step 1:	Determine risk category, see Table 103-1
Step 2:	Determine the basic wind speed, V, for the applicable risk category, see Figure 207A.5-1A, B or C
Step 3:	Determine wind load parameters: ➢ Wind directionality factor, K_d, see Section 207A.6 and Table 207A.6-1 ➢ Exposure category B, C or D, see Section 207A.7 ➢ Topographic factor, K_{zt}, see Section 207A.8 and Figure 207A.8-1 ➢ Enclosure classification, see Section 207A.10 ➢ Internal pressure coefficient, (GC_{pi}), see Section 207A.11 and Table 207A.11-1
Step 4:	Determine velocity pressure exposure coefficient K_z or K_h, see Table 207E.3-1
Step 5:	Determine velocity pressure, q_h, see Table 207E.3-1
Step 6:	Determine external pressure coefficient, (GC_p) ➢ Walls and flat roofs, $(\theta < 10^o)$, see Figure 207E.6-1 ➢ Gable and hip roofs, see Figure 207E.4-2 per Note 6 of Figure 207E.6-1 ➢ Arched roofs, see Figure 207B.4-3, footnote 4 ➢ Domed roofs, see Figure 207E.4-7
Step 7:	Calculate wind pressure, p, Equation 207E.6-1

OCCUPANCY CATEGORY IV
ENCLOSED BUILDING

BASIC WIND PRESSURE, V	250 kph		69.44 m/s
EXPOSURE B			
WIND DIRECTIONALITY FACTOR,	Kd	0.85	
TOPOGRAPHIC FACTOR,	Kzt	1	
INTERNAL PRESSURE COEFFICIENT,	GCpi	0.18	
MEAN ROOF HEIGHT	H	8.97 m	

Table 207E.3-1
Velocity Pressure Exposure Coefficients, K_h and K_z

Height above ground level, z (m)	Exposure B	C	D
0 - 4.5	0.70	0.85	1.03
6.0	0.70	0.90	1.08
7.5	0.70	0.94	1.12
9.0	0.70	0.98	1.16
12.0	0.76	1.04	1.22
15.0	0.81	1.09	1.27
18.0	0.85	1.13	1.31
21.0	0.89	1.17	1.34
24.0	0.93	1.21	1.38
27.0	0.96	1.24	1.40
30.0	0.99	1.26	1.43
36.0	1.04	1.31	1.48
42.0	1.09	1.36	1.52
48.0	1.13	1.39	1.55
54.0	1.17	1.43	1.58
60.0	1.20	1.46	1.61
75.0	1.28	1.53	1.68
90.0	1.35	1.59	1.73
105.0	1.41	1.64	1.78
120.0	1.47	1.69	1.82
135.0	1.52	1.73	1.86
150.0	1.56	1.77	1.89

207E.3.2 Velocity Pressure

Velocity pressure, q_z, evaluated at height z shall be calculated by the following equation:

$$q_z = 0.613 K_z K_{zt} K_d V^2 \quad (\text{N/m}^2); V \text{ in m/s} \qquad (207E.3\text{-}1)$$

	1.758720657	
qh	kPa	

207E.4.2 Design Wind Pressures

Design wind pressures on component and cladding elements of low-rise buildings and buildings with $h \leq 18$ m shall be determined from the following equation:

$$p = q_h[(GC_p) - (GC_{pi})] \ (\text{N/m}^2) \qquad 207E.4\text{-}1$$

p	2.075290375 kPa	-	1.442150939 kPa

TRUSS

Section Properties

Prop	Section	Area (cm^2)	I_{yy} (cm^4)	I_{zz} (cm^4)	J (cm^4)	Material
1	L20204	6.052	22.959	5.977	0.840	STEEL_ANGLE

Combination Load Cases

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
5	1.2DL + 0.5LL + 1WL1	1	DL	1.20
		2	LL	0.50
		3	WL1	1.00
6	1.2DL + 0.5LL + 1WL2	1	DL	1.20
		2	LL	0.50
		4	WL2	1.00
7	0.9DL + 1WL1	1	DL	0.90
		3	WL1	1.00
8	0.9DL + 1.0WL2	1	DL	0.90
		4	WL2	1.00

Beam Loads : 1 DL

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
1	UNI	kN/m	GY	-0.488	-	-	-	-
6	UNI	kN/m	GY	-0.488	-	-	-	-
10	UNI	kN/m	GY	-0.488	-	-	-	-
14	UNI	kN/m	GY	-0.488	-	-	-	-
18	UNI	kN/m	GY	-0.488	-	-	-	-
22	UNI	kN/m	GY	-0.488	-	-	-	-
26	UNI	kN/m	GY	-0.488	-	-	-	-
30	UNI	kN/m	GY	-0.488	-	-	-	-
34	UNI	kN/m	GY	-0.488	-	-	-	-
38	UNI	kN/m	GY	-0.488	-	-	-	-
42	UNI	kN/m	GY	-0.488	-	-	-	-
46	UNI	kN/m	GY	-0.488	-	-	-	-
50	UNI	kN/m	GY	-0.488	-	-	-	-
54	UNI	kN/m	GY	-0.488	-	-	-	-
58	UNI	kN/m	GY	-0.488	-	-	-	-
62	UNI	kN/m	GY	-0.488	-	-	-	-
66	UNI	kN/m	GY	-0.488	-	-	-	-
70	UNI	kN/m	GY	-0.488	-	-	-	-

Selfweight : 1 DL

Direction	Factor
Y	-1.000

Beam Loads : 2 LL

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
3	UNI	kN/m	GY	-0.800	-	-	-	-
8	UNI	kN/m	GY	-0.800	-	-	-	-
12	UNI	kN/m	GY	-0.800	-	-	-	-
16	UNI	kN/m	GY	-0.800	-	-	-	-
20	UNI	kN/m	GY	-0.800	-	-	-	-
24	UNI	kN/m	GY	-0.800	-	-	-	-
28	UNI	kN/m	GY	-0.800	-	-	-	-
32	UNI	kN/m	GY	-0.800	-	-	-	-
36	UNI	kN/m	GY	-0.800	-	-	-	-
40	UNI	kN/m	GY	-0.800	-	-	-	-
44	UNI	kN/m	GY	-0.800	-	-	-	-
48	UNI	kN/m	GY	-0.800	-	-	-	-
52	UNI	kN/m	GY	-0.800	-	-	-	-
56	UNI	kN/m	GY	-0.800	-	-	-	-
60	UNI	kN/m	GY	-0.800	-	-	-	-
64	UNI	kN/m	GY	-0.800	-	-	-	-
68	UNI	kN/m	GY	-0.800	-	-	-	-
72	UNI	kN/m	GY	-0.800	-	-	-	-

Beam Loads : 3 WL1

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
3	UNI	kN/m	GY	-2.075	-	-	-	-
8	UNI	kN/m	GY	-2.075	-	-	-	-
12	UNI	kN/m	GY	-2.075	-	-	-	-
16	UNI	kN/m	GY	-2.075	-	-	-	-
20	UNI	kN/m	GY	-2.075	-	-	-	-
24	UNI	kN/m	GY	-2.075	-	-	-	-
28	UNI	kN/m	GY	-2.075	-	-	-	-
32	UNI	kN/m	GY	-2.075	-	-	-	-
36	UNI	kN/m	GY	-2.075	-	-	-	-
40	UNI	kN/m	GY	-2.075	-	-	-	-
44	UNI	kN/m	GY	-2.075	-	-	-	-
48	UNI	kN/m	GY	-2.075	-	-	-	-
52	UNI	kN/m	GY	-2.075	-	-	-	-
56	UNI	kN/m	GY	-2.075	-	-	-	-
60	UNI	kN/m	GY	-2.075	-	-	-	-
64	UNI	kN/m	GY	-2.075	-	-	-	-
68	UNI	kN/m	GY	-2.075	-	-	-	-
72	UNI	kN/m	GY	-2.075	-	-	-	-

Beam Loads : 4 WL2

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
3	UNI	kN/m	GY	1.440	-	-	-	-
8	UNI	kN/m	GY	1.440	-	-	-	-
68	UNI	kN/m	GY	1.440	-	-	-	-
72	UNI	kN/m	GY	1.440	-	-	-	-

Utilization Ratio

Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (cm^2)	Iz (cm^4)	Iy (cm^4)	Ix (cm^4)
1	L20204	L20204	0.264	1.000	0.264	Eq. H1-1a	5	6.052	5.969	22.967	0.813
2	L20204	L20204	0.105	1.000	0.105	Eq. H1-1b	5	6.052	5.969	22.967	0.813
3	L20204	L20204	0.106	1.000	0.106	Eq. H1-1b	5	6.052	5.969	22.967	0.813
4	L20204	L20204	0.107	1.000	0.107	Eq. H1-1b	5	6.052	5.969	22.967	0.813
5	L20204	L20204	0.084	1.000	0.084	Eq. D2-1	5	6.052	5.969	22.967	0.813
6	L20204	L20204	0.140	1.000	0.140	Sec. E1	5	6.052	5.969	22.967	0.813
7	L20204	L20204	0.093	1.000	0.093	Eq. H1-1b	5	6.052	5.969	22.967	0.813
8	L20204	L20204	0.125	1.000	0.125	Eq. H1-1b	5	6.052	5.969	22.967	0.813
9	L20204	L20204	0.074	1.000	0.074	Eq. D2-1	5	6.052	5.969	22.967	0.813
10	L20204	L20204	0.083	1.000	0.083	Sec. E1	5	6.052	5.969	22.967	0.813
11	L20204	L20204	0.083	1.000	0.083	Eq. H1-1b	5	6.052	5.969	22.967	0.813
12	L20204	L20204	0.172	1.000	0.172	Sec. E1	5	6.052	5.969	22.967	0.813
13	L20204	L20204	0.064	1.000	0.064	Eq. D2-1	5	6.052	5.969	22.967	0.813
14	L20204	L20204	0.053	1.000	0.053	Eq. H1-1b	5	6.052	5.969	22.967	0.813
15	L20204	L20204	0.073	1.000	0.073	Eq. H1-1b	5	6.052	5.969	22.967	0.813

16	L20204	L20204	0.254	1.000	0.254	Eq. H1-1a	5	6.052	5.969	22.967	0.813
17	L20204	L20204	0.054	1.000	0.054	Eq. D2-1	5	6.052	5.969	22.967	0.813
18	L20204	L20204	0.042	1.000	0.042	Eq. H1-1b	5	6.052	5.969	22.967	0.813
19	L20204	L20204	0.063	1.000	0.063	Eq. H1-1b	5	6.052	5.969	22.967	0.813
20	L20204	L20204	0.282	1.000	0.282	Eq. H1-1a	5	6.052	5.969	22.967	0.813
21	L20204	L20204	0.044	1.000	0.044	Eq. D2-1	5	6.052	5.969	22.967	0.813
22	L20204	L20204	0.059	1.000	0.059	Eq. H1-1b	5	6.052	5.969	22.967	0.813
23	L20204	L20204	0.053	1.000	0.053	Eq. H1-1b	5	6.052	5.969	22.967	0.813
24	L20204	L20204	0.308	1.000	0.308	Eq. H1-1a	5	6.052	5.969	22.967	0.813
25	L20204	L20204	0.034	1.000	0.034	Eq. D2-1	5	6.052	5.969	22.967	0.813
26	L20204	L20204	0.071	1.000	0.071	Eq. H1-1b	5	6.052	5.969	22.967	0.813
27	L20204	L20204	0.043	1.000	0.043	Eq. H1-1b	5	6.052	5.969	22.967	0.813
28	L20204	L20204	0.328	1.000	0.328	Eq. H1-1a	5	6.052	5.969	22.967	0.813
29	L20204	L20204	0.024	1.000	0.024	Eq. D2-1	5	6.052	5.969	22.967	0.813
30	L20204	L20204	0.085	1.000	0.085	Eq. D2-1	5	6.052	5.969	22.967	0.813
31	L20204	L20204	0.033	1.000	0.033	Eq. H1-1b	5	6.052	5.969	22.967	0.813
32	L20204	L20204	0.341	1.000	0.341	Eq. H1-1a	5	6.052	5.969	22.967	0.813
33	L20204	L20204	0.014	1.000	0.014	Eq. D2-1	5	6.052	5.969	22.967	0.813
34	L20204	L20204	0.096	1.000	0.096	Eq. D2-1	5	6.052	5.969	22.967	0.813
35	L20204	L20204	0.023	1.000	0.023	Eq. H1-1b	5	6.052	5.969	22.967	0.813
36	L20204	L20204	0.345	1.000	0.345	Eq. H1-1a	5	6.052	5.969	22.967	0.813
37	L20204	L20204	0.006	1.000	0.006	Eq. H1-1b	5	6.052	5.969	22.967	0.813
38	L20204	L20204	0.099	1.000	0.099	Eq. D2-1	5	6.052	5.969	22.967	0.813
39	L20204	L20204	0.018	1.000	0.018	Eq. H1-1b	5	6.052	5.969	22.967	0.813
40	L20204	L20204	0.341	1.000	0.341	Eq. H1-1a	5	6.052	5.969	22.967	0.813
41	L20204	L20204	0.007	1.000	0.007	Eq. H1-1b	5	6.052	5.969	22.967	0.813
42	L20204	L20204	0.095	1.000	0.095	Eq. D2-1	5	6.052	5.969	22.967	0.813
43	L20204	L20204	0.015	1.000	0.015	Eq. H1-1b	5	6.052	5.969	22.967	0.813
44	L20204	L20204	0.328	1.000	0.328	Eq. H1-1a	5	6.052	5.969	22.967	0.813
45	L20204	L20204	0.018	1.000	0.018	Sec. E1	5	6.052	5.969	22.967	0.813
46	L20204	L20204	0.084	1.000	0.084	Eq. D2-1	5	6.052	5.969	22.967	0.813
47	L20204	L20204	0.020	1.000	0.020	Eq. D2-1	5	6.052	5.969	22.967	0.813
48	L20204	L20204	0.307	1.000	0.307	Eq. H1-1a	5	6.052	5.969	22.967	0.813
49	L20204	L20204	0.029	1.000	0.029	Sec. E1	5	6.052	5.969	22.967	0.813
50	L20204	L20204	0.066	1.000	0.066	Eq. D2-1	5	6.052	5.969	22.967	0.813
51	L20204	L20204	0.027	1.000	0.027	Eq. D2-1	5	6.052	5.969	22.967	0.813
52	L20204	L20204	0.279	1.000	0.279	Eq. H1-1a	5	6.052	5.969	22.967	0.813
53	L20204	L20204	0.040	1.000	0.040	Sec. E1	5	6.052	5.969	22.967	0.813
54	L20204	L20204	0.040	1.000	0.040	Eq. D2-1	5	6.052	5.969	22.967	0.813
55	L20204	L20204	0.034	1.000	0.034	Eq. D2-1	5	6.052	5.969	22.967	0.813
56	L20204	L20204	0.242	1.000	0.242	Eq. H1-1a	5	6.052	5.969	22.967	0.813
57	L20204	L20204	0.051	1.000	0.051	Sec. E1	5	6.052	5.969	22.967	0.813
58	L20204	L20204	0.022	1.000	0.022	Eq. H3-8	5	6.052	5.969	22.967	0.813
59	L20204	L20204	0.041	1.000	0.041	Eq. D2-1	5	6.052	5.969	22.967	0.813
60	L20204	L20204	0.174	1.000	0.174	Sec. E1	5	6.052	5.969	22.967	0.813
61	L20204	L20204	0.062	1.000	0.062	Sec. E1	5	6.052	5.969	22.967	0.813
62	L20204	L20204	0.035	1.000	0.035	Sec. E1	5	6.052	5.969	22.967	0.813
63	L20204	L20204	0.049	1.000	0.049	Eq. H1-1b	5	6.052	5.969	22.967	0.813
64	L20204	L20204	0.124	1.000	0.124	Sec. E1	5	6.052	5.969	22.967	0.813
65	L20204	L20204	0.073	1.000	0.073	Sec. E1	5	6.052	5.969	22.967	0.813
66	L20204	L20204	0.085	1.000	0.085	Sec. E1	5	6.052	5.969	22.967	0.813
67	L20204	L20204	0.055	1.000	0.055	Eq. D2-1	5	6.052	5.969	22.967	0.813
68	L20204	L20204	0.082	1.000	0.082	Eq. H1-1b	5	6.052	5.969	22.967	0.813
69	L20204	L20204	0.083	1.000	0.083	Sec. E1	5	6.052	5.969	22.967	0.813
70	L20204	L20204	0.142	1.000	0.142	Sec. E1	5	6.052	5.969	22.967	0.813
71	L20204	L20204	0.037	1.000	0.037	Eq. H1-1b	5	6.052	5.969	22.967	0.813
72	L20204	L20204	0.062	1.000	0.062	Eq. H3-8	5	6.052	5.969	22.967	0.813
73	L20204	L20204	0.095	1.000	0.095	Sec. E1	5	6.052	5.969	22.967	0.813

Failed Members

There is no data of this type.

Statics Check Results

L/C		FX (kN)	FY (kN)	FZ (kN)	MX (kNm)	MY (kNm)	MZ (kNm)
1:DL	Loads	0.000	-3.757	0.000	0.000	0.000	-10.145
1:DL	Reactions	-0.000	3.757	0.000	0.000	0.000	10.145
	Difference	-0.000	-0.000	0.000	0.000	0.000	-0.000
2:LL	Loads	0.000	-4.320	0.000	0.000	0.000	-11.664
2:LL	Reactions	-0.000	4.320	0.000	0.000	0.000	11.664
	Difference	-0.000	-0.000	0.000	0.000	0.000	-0.000
3:WL1	Loads	0.000	-11.205	0.000	0.000	0.000	-30.254
3:WL1	Reactions	-0.000	11.205	0.000	0.000	0.000	30.253
	Difference	-0.000	-0.000	0.000	0.000	0.000	-0.000
4:WL2	Loads	0.000	1.728	0.000	0.000	0.000	4.666
4:WL2	Reactions	0.000	-1.728	0.000	0.000	0.000	-4.666
	Difference	0.000	0.000	0.000	0.000	0.000	0.000

PURLINS

Section Properties

Prop	Section	Area (cm^2)	I_{yy} (cm^4)	I_{zz} (cm^4)	J (cm^4)	Material
1	C8X11 D	43.613	227.503	2.71E+3	9.689	STEEL

Combination Load Cases

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
5	1.2DL + 0.5LL + 1.0WL1	1	DL	1.20
		2	LL	0.55
		3	WL1	1.00
6	1.2DL + 0.5LL + 1.0WL2	1	DL	1.20
		2	LL	0.50
		4	WL2	1.00
7	0.9DL + 1.0WL1	1	DL	0.90
		3	WL1	1.00
8	0.9DL + 1.0WL2	1	DL	0.90
		4	WL2	1.00
9	1.0DL + 1.0LL	1	DL	1.00
		2	LL	1.00

Beam Loads : 1 DL

Beam	Type	Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
1	UNI kN/m	GY	-0.200	-	-	-	-
2	UNI kN/m	GY	-0.200	-	-	-	-
3	UNI kN/m	GY	-0.200	-	-	-	-
4	UNI kN/m	GY	-0.200	-	-	-	-
5	UNI kN/m	GY	-0.200	-	-	-	-
6	UNI kN/m	GY	-0.200	-	-	-	-

Selfweight : 1 DL

Direction	Factor
Y	-1.000

Beam Loads : 2 LL

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
1	UNI	kN/m	GY	-2.000	-	-	-	-
2	UNI	kN/m	GY	-2.000	-	-	-	-
3	UNI	kN/m	GY	-2.000	-	-	-	-
4	UNI	kN/m	GY	-2.000	-	-	-	-
5	UNI	kN/m	GY	-2.000	-	-	-	-
6	UNI	kN/m	GY	-2.000	-	-	-	-

Beam Loads : 3 WL1

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
1	UNI	kN/m	GY	-2.075	-	-	-	-
2	UNI	kN/m	GY	-2.075	-	-	-	-
3	UNI	kN/m	GY	-2.075	-	-	-	-
4	UNI	kN/m	GY	-2.075	-	-	-	-
5	UNI	kN/m	GY	-2.075	-	-	-	-
6	UNI	kN/m	GY	-2.075	-	-	-	-

Beam Loads : 4 WL2

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
2	UNI	kN/m	GY	1.440	-	-	-	-
3	UNI	kN/m	GY	1.440	-	-	-	-

Utilization Ratio

Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (cm^2)	Iz (cm^4)	Iy (cm^4)	Ix (cm^4)
1	C8X11	C8X11D	0.006	1.000	0.006		5	43.613	2.71E+3	201.303	10.042
2	C8X11	C8X11D	0.005	1.000	0.005		5	43.613	2.71E+3	201.303	10.042
3	C8X11	C8X11D	0.005	1.000	0.005		5	43.613	2.71E+3	201.303	10.042
4	C8X11	C8X11D	0.007	1.000	0.007		5	43.613	2.71E+3	201.303	10.042
5	C8X11	C8X11D	0.002	1.000	0.002		5	43.613	2.71E+3	201.303	10.042
6	C8X11	C8X11D	0.001	1.000	0.001		5	43.613	2.71E+3	201.303	10.042

Failed Members

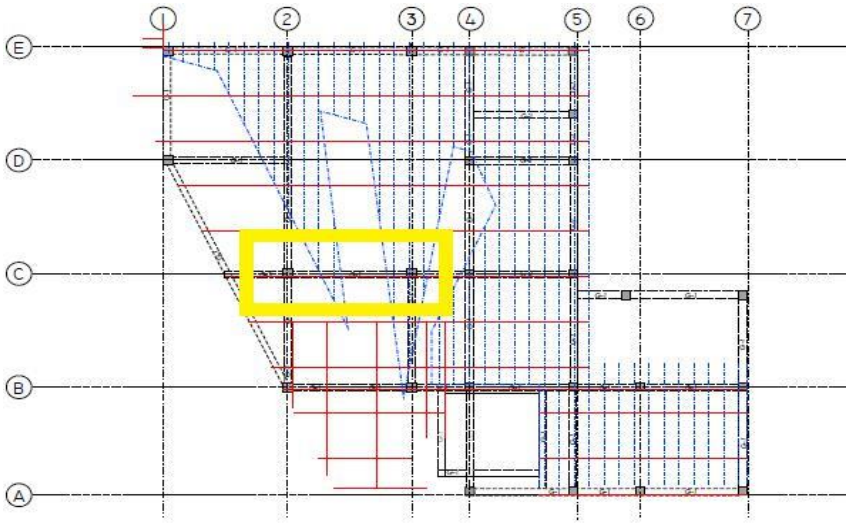
There is no data of this type.

Statics Check Results

L/C		FX (kN)	FY (kN)	FZ (kN)	MX (kNm)	MY (kNm)	MZ (kNm)
1:DL	Loads	0.000	-1.926	0.000	0.000	0.000	-3.467
1:DL	Reactions	0.000	1.926	0.000	0.000	0.000	3.467
	Difference	0.000	0.000	0.000	0.000	0.000	-0.000
2:LL	Loads	0.000	-7.200	0.000	0.000	0.000	-12.960
2:LL	Reactions	0.000	7.200	0.000	0.000	0.000	12.960
	Difference	0.000	-0.000	0.000	0.000	0.000	-0.000
3:WL1	Loads	0.000	-7.470	0.000	0.000	0.000	-13.446
3:WL1	Reactions	0.000	7.470	0.000	0.000	0.000	13.446
	Difference	0.000	0.000	0.000	0.000	0.000	-0.000
4:WL2	Loads	0.000	2.304	0.000	0.000	0.000	4.147
4:WL2	Reactions	0.000	-2.304	0.000	0.000	0.000	-4.147
	Difference	0.000	0.000	0.000	0.000	0.000	0.000

Design of Beams - Singly Reinforced

RB-1



Material Properties		
f'c	**20.7**	Mpa
fy	**289.58**	Mpa
Yc	**23.6**	KN/m
ø	**0.9**	

Total uniform dead load, Wd	15.16kN/m
Total uniform live load, Wl	5kN/m
Assumed beam weight, Wa	2.832 kN/m
Factored Uniform Load	29.5904kN/m

Maximum moment value taken,
Maximum positive moment, Mu **78.266608 KN-m**
Maximum negative moment, Mu **52.177739 KN-m**

Assumed ρ=0.4ρbal $\rho bal = \frac{.85f'c(\beta 1)}{fy}(\frac{600}{600+fy})$ 0.013933681 << use this

ρmax= $\left(\frac{.85f'c\beta}{fy}\right)\left(\frac{3}{8}\right)$ 0.019367381

ρmin= $\frac{1.4}{fy}$ 0.004834588

In respect to Positive Moment Force,

Assumed d=1.50b

Solve for b $Mu = \phi bd^2(\rho f'y)(1-\frac{\rho f'y}{1.7f'c})$ 221.17488 mm

b ≈ 300 mm

φ=.90

Solve for d , 331.762 mm

d ≈ 400 mm

Concrete cover = 50 mm

Total beam depth
= 450 mm
Beam weight = 2.832 KN/m
Since assumed weight > actual beam weight

2.832 > 2.832 OK!

Using 20 mm Ø RSB,
As = ρbd 1672.041724 mm2
Ab= 314.16 mm2
n= 5.322261662 ≈ 6 pcs

Checking for moment capacity,
T=C
Asfy=.85f'ca
b
solve for a: 103.409438 mm
Mu(cap)=Φas(fy)(d-a/2) 168.641037 KN-m
Mu(cap)>Mu .: OK
168.641037 > 78.2666

In respect to Negative Moment Force,
Assumed d=1.50b
Solve for b 193.2141 mm
b ≈ 300 mm
ϕ=.90 $\phi M_u = \phi b d^2 (\rho f'y)(1 - \frac{\rho f'y}{1.7 f'c})$
Solve for d , 289.821 mm
d ≈ 400 mm
Concrete cover = 50 mm
Total beam depth = 450 mm
Beam weight = 2.832 KN/m
Since assumed weight > actual beam weight
2.832 > 2.832 OK!

Using 20 mm Ø RSB,
As = ρbd 1672.041724 mm2
Ab= 314.16 mm2
n= 5.322261662 ≈ 6 pcs

Checking for moment capacity,

T=C

Asfy=.85f'cab

solve for a:	103.409438	mm
Mu(cap)=Φas(fy)(d-a/2)	168.641037	KN-m

Mu(cap)>Mu .:

OK

168.6410373 > 52.177739

Vertical Stirrup Design:

Bar:	10	mm	fc:	20.7 Mpa
Vu:	68.0579	kN	fy:	289.58 Mpa
φVc:	68.2459	kN	bw:	300 mm
(1/2)φVc:	34.1229	kN		
	157.0			
Av:	8			
d w/o cover	400	mm	Vs:	207.201
Clear span length of beam	4.6	m		159.24
	4600	mm		

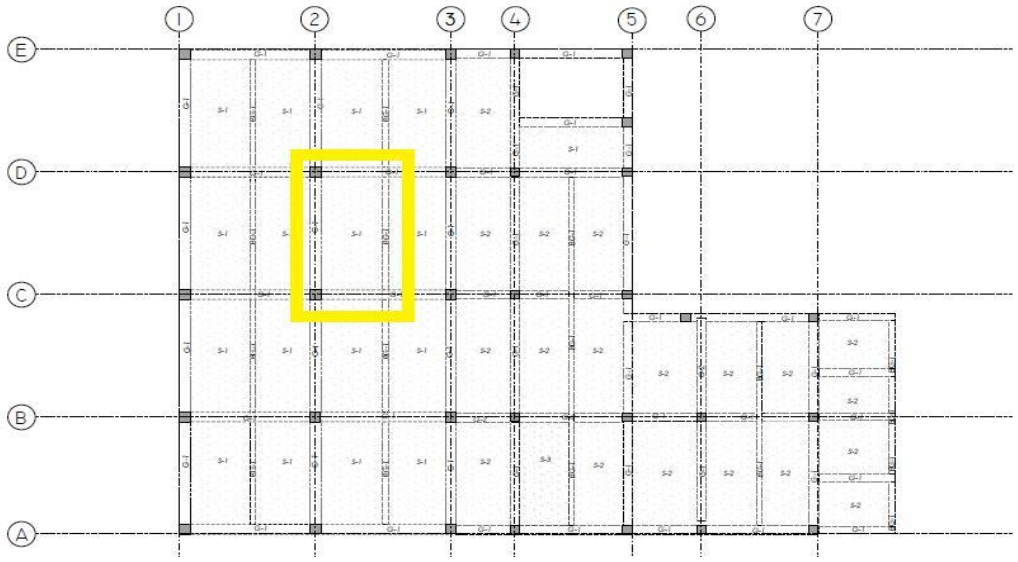
Spacing, mm

D from Support	Vu, KN			$if\ Vs < \frac{1}{3}\sqrt{f'c}\,(bw)(d)$		$Smax = \frac{d}{2}\ or\ 600\,mm$
0.42	55.629952	16.8212	1081.66193	454.87226	533.2158023	210
1.00	38.46752	39.7045	458.257889	454.87226	533.2158023	210
1.50	23.67232	59.4314	306.149391	454.87226	533.2158023	210
2.00	8.87712	79.1583	229.854357	454.87226	533.2158023	NSN
2.50	5.91808	83.1037	218.941919	454.87226	533.2158023	NSN
3.50	35.50848	43.6499	416.837267	454.87226	533.2158023	NSN
4.50	65.09888	4.196	4336.24794	454.87226	533.2158023	210
5.00	79.89408	15.5309	1171.52579	454.87226	533.2158023	210

* if Vu < 1/2(ϕ)(Vc) = no stirrups needed (NSN)

10mm stirrups spaced at 5@50mm, 10@100mm, rest @ 200mm OC

ONE-WAY SLAB DESIGN
S-1



Clear Span, Lc	4600 mm ≈	4.6m
f'c	20.7 mpa	
f'y	289.58 mpa	
ϕ	0.9	
	0.85	

UNIT WT. OF CONCRETE, γ 23.6 kN/m3

Thickness of Slab	150 mm
Effective depth, d	125 mm
Concrete Cover	25 mm
Total Live Loads(1-m strip)	4.8 Kn/m
Total Dead Loads(1-m stip)	5.04 Kn/m
Ultimate Load	13.73 Kn/m

ULTIMATE LOAD (FACTORED)

Wu 1.2 (DL) + 1.6(LL)

MAXIMUM POSITIVE MOMENT ASSUMING SIMPLY SUPPORTED:

Mmax.pos 36.3106 kN-m

MAXIMUM NEGATIVE MOMENT ASSUMING FIXED END SUPPORTED:

Mmax.neg	24.207 kN-m

Negative Moment Reinforcement

Mu Max	24.207	Kn -m
Coefficient of Resistance, Rn	1.72139	Mpa
Rho Supplied,	0.00627	<< adapt
Rho Minimum,	0.00483	
Rho Max,	0.01937	
Area of Steel	783.463	

$$\frac{.0.85f'c}{fy}\left(1-\sqrt{1-\frac{2Rn}{0.85f'c}}\right)$$

$$\frac{1.4}{fy}$$

Say 12mm Diameter bar

Number of Bars	6.92734	pcs
Spacing	144.356	mm
Max Spacing by the Code:		
3(h)	450	mm
450	450	mm
Adopt Spacing:	144.356	mm
Say	**150**	**mm**

Positive Moment Reinforcement

Mu Max	36.3106	Kn -m
Coefficient of Resistance, Rn	2.58208	Mpa
Rho Supplied,	0.00969	<< adapt
Rho Minimum,	0.00483	
Rho Max,	0.01937	
Area of Steel	1211.15	mm^2

Say 12mm Diameter bar

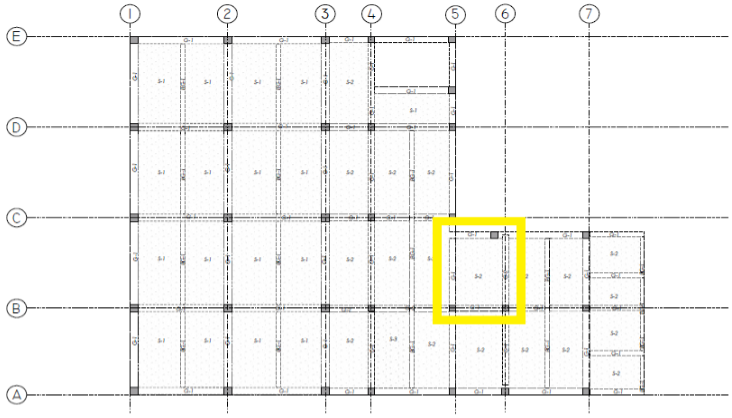
Number of Bars	10.7089	pcs
Spacing	93.3801	mm
Max Spacing by the Code:		
3(h)	450	mm
450	450	mm
Adopt Spacing:	93.3801	mm
Say	**150**	**mm**

Shrinkage and Temperature Bars

Using 10mm Ø bar,

		0.002	
Area of Steel Bar, At		250	mm^2
Area of Bar, Asb		78.5398	mm^2
Number of Bars		3.1831	pcs
Spacing, S		314.159	mm
Max Spacing by the Code:			
5(h)		625	mm
	450	450	mm
Adopt Spacing:		314.159	mm
Say		**300**	**mm**

DESIGN OF TWO-WAY SLAB
S-2



DESIGN PARAMETERS	
f'c =	20.7 MPa
fy =	289.58 MPa
Ø =	12 mm
t =	150 mm
L =	3 m
B =	2.5 m
smax =	450 mm
b =	1000 mm
d =	124 mm

Live Load = 2.9 kPa
Dead Load = 5.04 kPa

Support Condition:

Case 4 

Coefficients,

-CaDL =	**0.06**	+CaDL =	**0.024**
-CaLL =	**0.06**	+CaLL =	**0.037**
-CbDL =	**0.031**	+CbDL =	**0.012**
-CbLL =	**0.031**	+CbLL =	**0.019**

Negative Moment, Ma,

	Moments	M_{total}	$r_{req'd}$	r_{used}	Spacing	Max. Spacing
-CaDLWuDLLa2	3.12	6.00	0.0015	0.0020	450.00	**300.00**
-CaLLWuLLLa2	2.88					

Negative Moment, Mb,

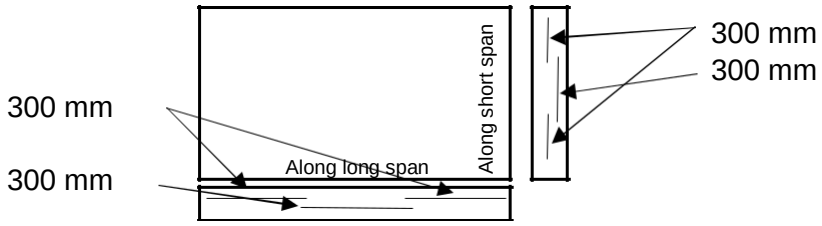
	Moments	M_{total}	$r_{req'd}$	r_{used}	Spacing	Max. Spacing
-CbDLWuDLLb2	2.32	4.47	0.0011	0.0015	450.00	**300.00**
-CbLLWuLLLb2	2.14					

Positive Moment, Ma,

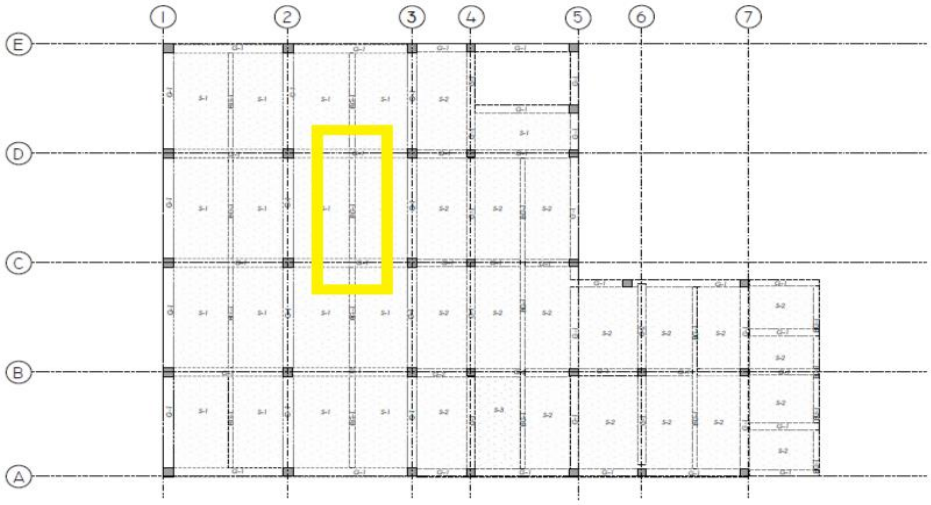
	Moments	M_{total}	$r_{req'd}$	r_{used}	Spacing	Max. Spacing
+CaDLWuDLLa2	1.25	3.03	0.0008	0.0010	450.00	**300.00**
+CaLLWuLLLa2	1.78					

Positive Moment, Mb,

	Moments	M_{total}	$r_{req'd}$	r_{used}	Spacing	Max. Spacing
+CbDLWuDLLb2	0.90	2.21	0.0006	0.0007	450.00	**300.00**
+CbLLWuLLLb2	1.31					



Design of Beams - Singly Reinforced
(B-1)



Material Properties	
f'c	**20.7** Mpa
fy	**289.58** Mpa
Yc	**23.6** KN/m

Total uniform dead load, Wd	15.432kN/m
Total uniform live load, Wl	12kN/m
Assumed beam weight, Wa	2.832 kN/m
Factored Uniform Load	37.7184kN/m

Maximum moment value taken,
Maximum positive moment, Mu **99.765168 KN-m**
Maximum negative moment, Mu **66.510112 KN-m**

Assumed ρ=0.4ρbal $\rho bal = \frac{.85f'c(\beta 1)}{fy}(\frac{600}{600+fy})$ 0.013933681 << use this

ρmax= $\left(\frac{.85f'c\beta}{fy}\right)\left(\frac{3}{8}\right)$ 0.019367381

ρmin= $\frac{1.4}{fy}$ 0.004834588

In respect to Positive Moment Force,
Assumed d=1.50b
Solve for b 239.8114626 mm

b ≈ 300 mm

φ=.90
Solve for d
, 359.7171939 mm
d ≈ 400 mm
Concrete cover = 50 mm
Total beam depth = 450 mm
Beam weight = 2.832 KN/m
Since assumed weight > actual beam weight its
OK
2.832 > 2.832

Using 20 mm Ø RSB,

As = ρbd	1672.041724 mm2			
Ab=	314.16 mm2			
n=	5.322261662	≈	6	pcs

Checking for moment capacity,

T=C
Asfy=.85f'cab
solve for a: 103.409438 mm
Mu(cap)=Φas(fy)(d-a/2) 171.103852 KN-m
Mu(cap)>Mu .: OK
171.103852 > 99.765168

In respect to Negative Moment
Force,
Assumed d=1.50b
Solve for b 209.4946mm
b ≈ 250 mm

$$M_u = \phi b d^2 (\rho f'y)(1 - \frac{\rho f'y}{1.7 f'c})$$

φ=.90
Solve for d
, 375 mm
d ≈ **400** mm
Concrete cover = 50 mm
Total beam depth = 450 mm
Beam weight = 2.36 KN/m
Since assumed weight > actual beam weight its OK
2.832 > 2.36

Using 20 mm Ø RSB,
As = ρbd 1393.368103 mm2
Ab= 314.16 mm2
n= 4.435218052 ≈ 5 pcs

Checking for moment capacity,

T=C
Asfy=.85f'cab

solve for a: 103.409438 mm
Mu(cap)=Φas(fy)(d-a/2) 142.586543 KN-m
Mu(cap)>Mu .: OK
142.5865433 > 66.510112

Vertical Stirrup Design:

Bar:	10 mm	fc:	20.7 Mpa
Vu:	86.75232 kN	fy:	289.58 Mpa
φVc:	68.245879 kN	bw:	300 mm
(1/2)φVc:	34.1229395 kN	$if\ Vs < \frac{1}{3}\sqrt{f'c}\,(bw)(d)\ Smax = \frac{d}{2}\ or\ 600\,mm$	
Av:	157.08		
d w/o cover	400 mm	Vs:	207.201
Clear span length of beam	4600 mm	$\frac{1}{3}(\sqrt{f'c})(bw)(d)$	159.24
	4.6 m		

Spacing, mm

D from Support	Vu, KN					
0.42	70.910592	3.552950671	5121.06478	454.872264	533.2158023	210
1.00	49.03392	25.61594533	710.295495	454.872264	533.2158023	210
1.50	30.17472	50.76154533	358.438468	454.872264	533.2158023	210
2.00	11.31552	75.90714533	239.699313	454.872264	533.2158023	NSN
2.50	7.54368	80.93626533	224.805166	454.872264	533.2158023	NSN
3.50	45.26208	30.64506533	593.729867	454.872264	533.2158023	210
4.50	82.98048	19.64613467	926.130807	454.872264	533.2158023	210
5.00	101.83968	44.79173467	406.210893	454.872264	533.2158023	105

* if Vu < 1/2(ϕ)(Vc) = no stirrups needed (NSN)

10mm stirrups spaced at 5@50mm, 15@100mm, rest @ 200mm OC

LOAD DIAGRAMS (CONSIDERING 4 SPANS OF BEAM)

DEAD LOADS

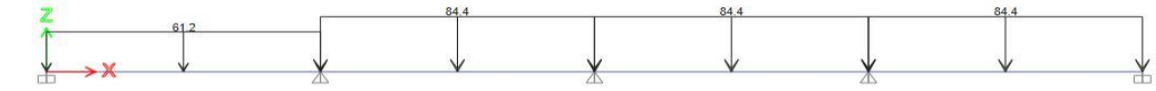
Self weight of the beam	2.832		
Concrete fill finish	1.1 kPa		
Slab self weight	3.54		
Gypsum Board (12.5mm)	0.1 kPa		
MEP	0.1 kPa		
Suspended Steel Channel	0.1 kPa		
Partition	1.9 kPa		
Ceramic tile (20mm)	0.16 kPa		
TOTAL	**7 kPa**		
		Wdl	37.832 kN

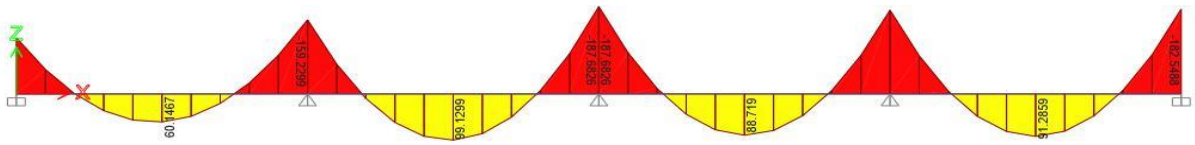
LIVE LOADS

CONFERENCE HALL	4.8 kPa	24
GARDEN DECK	1.9 kPa	9.5

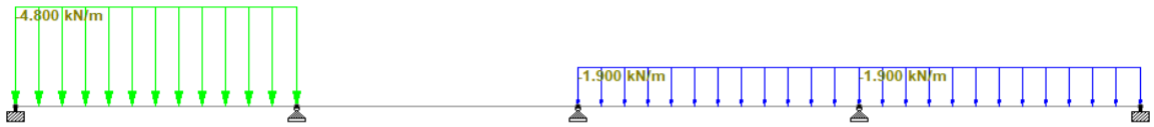
Wll	33.5 kN

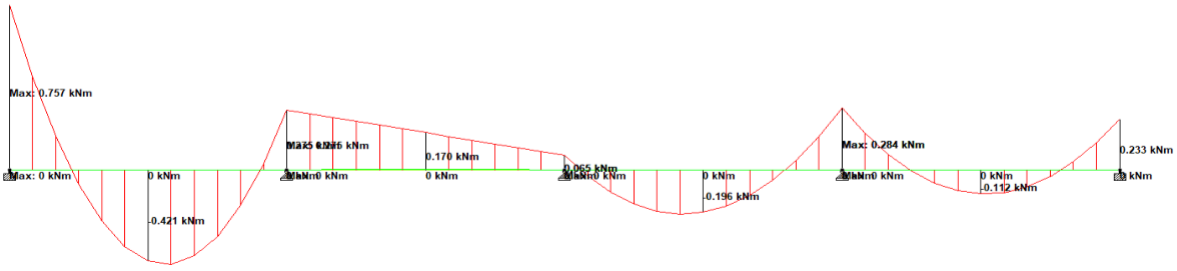
LOAD CASE 1 (DEAD LOADS & LIVE LOADS COMBINED)



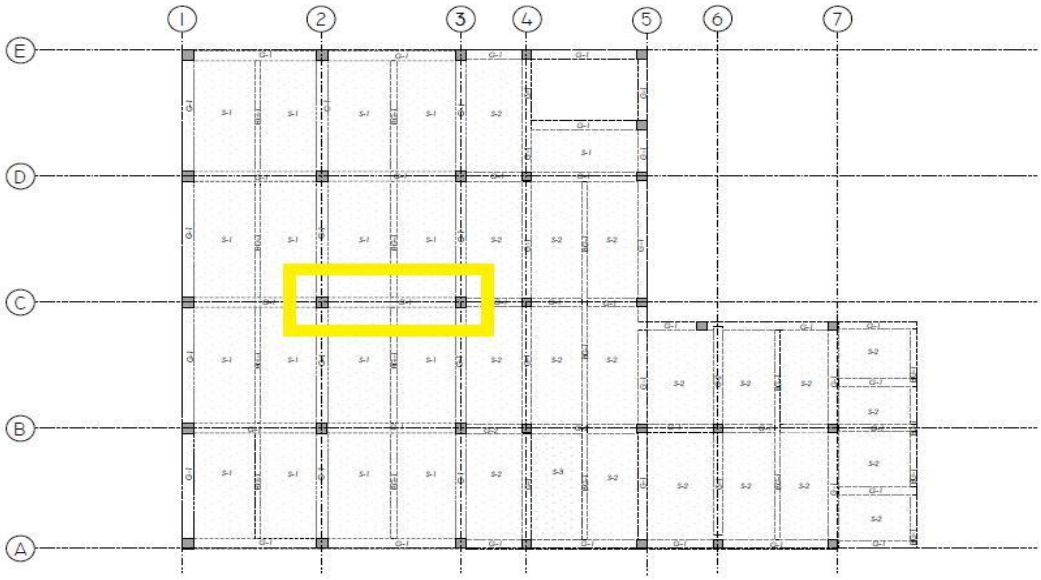


LOAD CASE 2 (LIVE LOADS ONLY)





Design of Beams - Singly Reinforced
(G-1)



Material Properties		
f'c	**20.7**	Mpa
fy	**289.58**	Mpa
Yc	**23.6**	KN/m
ø	**0.9**	

Total uniform dead load, Wd	15.35kN/m
Total uniform live load, Wl	15kN/m
Assumed beam weight, Wa	2.832 kN/m
Factored Uniform Load	45.8184kN/m

Maximum moment value taken,
Maximum positive moment, Mu **121.18967 KN-m**
Maximum negative moment, Mu **80.793112 KN-m**

Assumed ρ=0.4ρbal $\rho bal = \frac{.85f'c(\beta 1)}{fy}(\frac{600}{600+fy})$ 0.013933681 << use this

ρmax= $\left(\frac{.85f'c\beta}{fy}\right)\frac{3}{8}$ 0.019367381

ρmin= $\frac{1.4}{fy}$ 0.004834588

In respect to Positive Moment Force,
Assumed d=1.50b
Solve for b $Mu = \phi b d^2(\rho f'y)(1-\frac{\rho f'y}{1.7f'c})$ 255.87753 mm
b ≈ 300 **mm**

φ=.90
Solve for d , 383.816 mm
d ≈ 400 mm
Concrete cover = 50 mm

Total beam depth = 450 mm
Beam weight = 2.832 KN/m
Since assumed weight > actual beam weight
2.832 > 2.832 OK!

Using 20 mm Ø RSB,
As = ρbd 1672.041724 mm2
Ab= 314.16 mm2
n= 5.322261662 ≈ 6 pcs

Checking for moment capacity,

T=C
Asfy=.85f'ca
b
solve for a: 103.409438 mm
Mu(cap)=Φas(fy)(d-a/2) 168.641037 KN-m
Mu(cap)>Mu .: OK
168.641037 > 121.19

In respect to Negative Moment Force,
Assumed d=1.50b
Solve for b 223.5296 mm
b ≈ 300 mm

φ=.90
Solve for d , $Mu = \phi bd^2(\rho f'y(1 - \frac{\rho f'y}{1.7f'c})$ 335.294 mm
d ≈ 400 mm
Concrete cover = 50 mm
Total beam depth = 450 mm
Beam weight = 2.832 KN/m
Since assumed weight > actual beam weight
2.832 > 2.832 OK!

Using 20 mm Ø RSB,
As = ρbd 1672.041724 mm2
Ab= 314.16 mm2
n= 5.322261662 ≈ 6 pcs

Checking for moment capacity,

T=C
Asfy=.85f'ca
b
solve for a: 103.409438 mm
Mu(cap)=Φas(fy)(d-a/2) 168.641037 KN-m
Mu(cap)>Mu .: OK
168.6410373 > 80.793112

Vertical Stirrup Design:

Bar:	10 mm	fc:	20.7 Mpa
Vu:	105.382 kN	fy:	289.58 Mpa
φVc:	68.2459 kN	bw:	300 mm
(1/2)φVc:	34.1229 kN		
	157.0		
Av:	8		
d w/o cover	400 mm	Vs:	207.201
Clear span length of beam	4.6 m		159.24
	4600 mm		

Spacing, mm

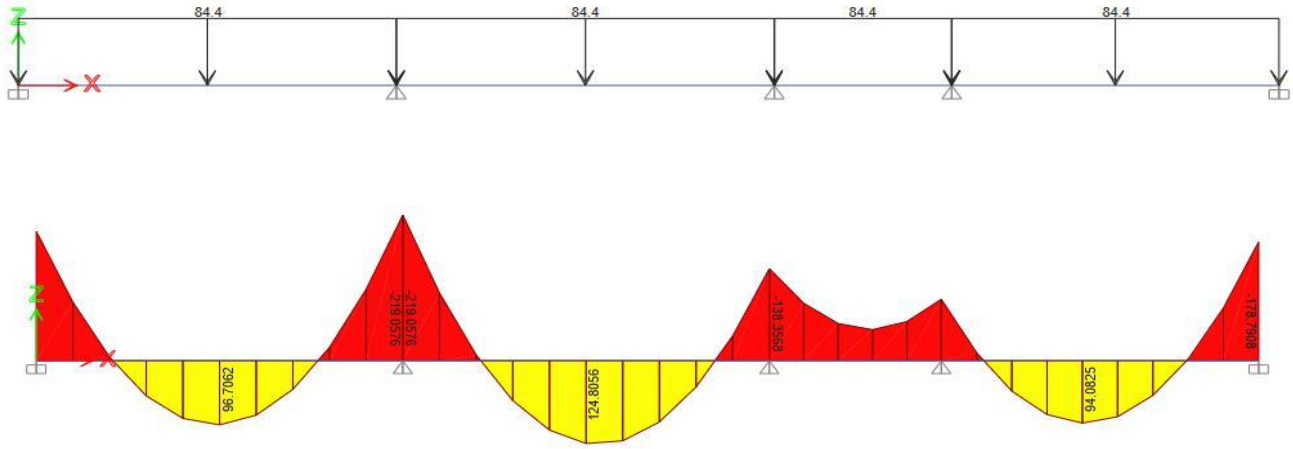
D from Support	Vu, KN					
				$if\ Vs < \frac{1}{3}\sqrt{f'c}\,(bw)(d)$		$Smax = \frac{d}{2}\ or\ 600\,mm$
0.42	86.138592	23.857	762.666227	454.87226	533.2158023	210
1.00	59.56392	11.5759	1571.78442	$\frac{1}{3}(\sqrt{f'c})(bw)(d)$	533.2158023	210
1.50	36.65472	42.1215	431.961611	454.87226	533.2158023	210
2.00	13.74552	72.6671	250.386753	454.87226	533.2158023	NSN
2.50	9.16368	78.7763	230.969195	454.87226	533.2158023	NSN
3.50	54.98208	17.6851	1028.82801	454.87226	533.2158023	NSN
4.50	100.80048	43.4061	419.177858	454.87226	533.2158023	210
5.00	123.70968	73.9517	246.037373	454.87226	533.2158023	210

* if Vu < 1/2(ϕ)(Vc) = no stirrups needed (NSN)

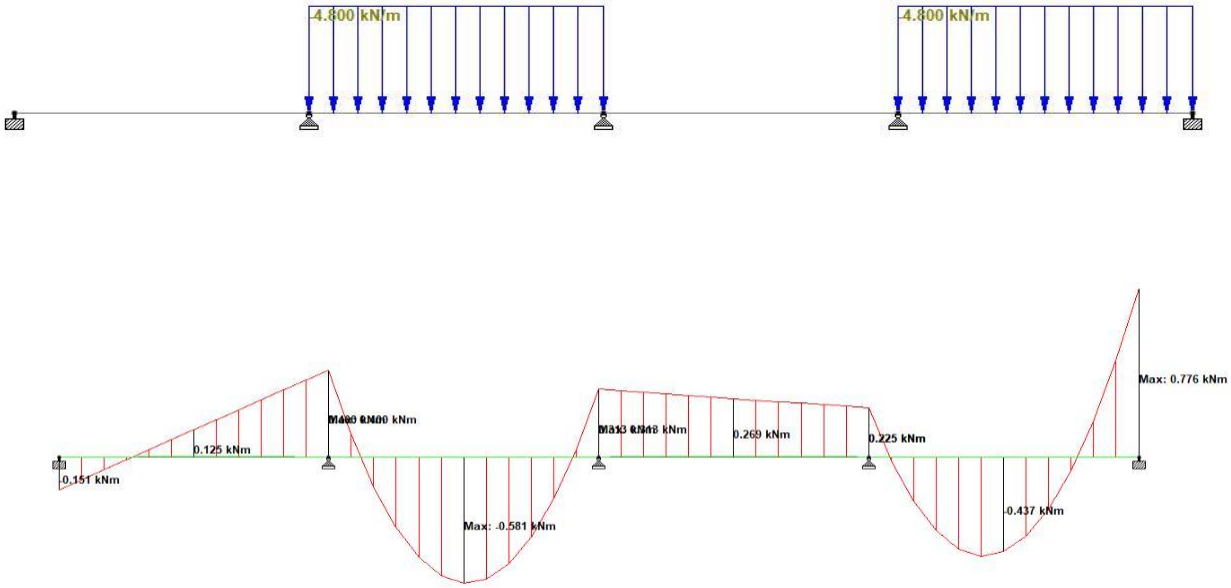
10mm stirrups spaced at 5@50mm, 10@100mm, rest @ 200mm OC

LOAD DIAGRAM (CONSIDERING 4 SPANS OF BEAM)

LOAD CASE 1 (DEAD LOADS & LIVE LOADS COMBINED)

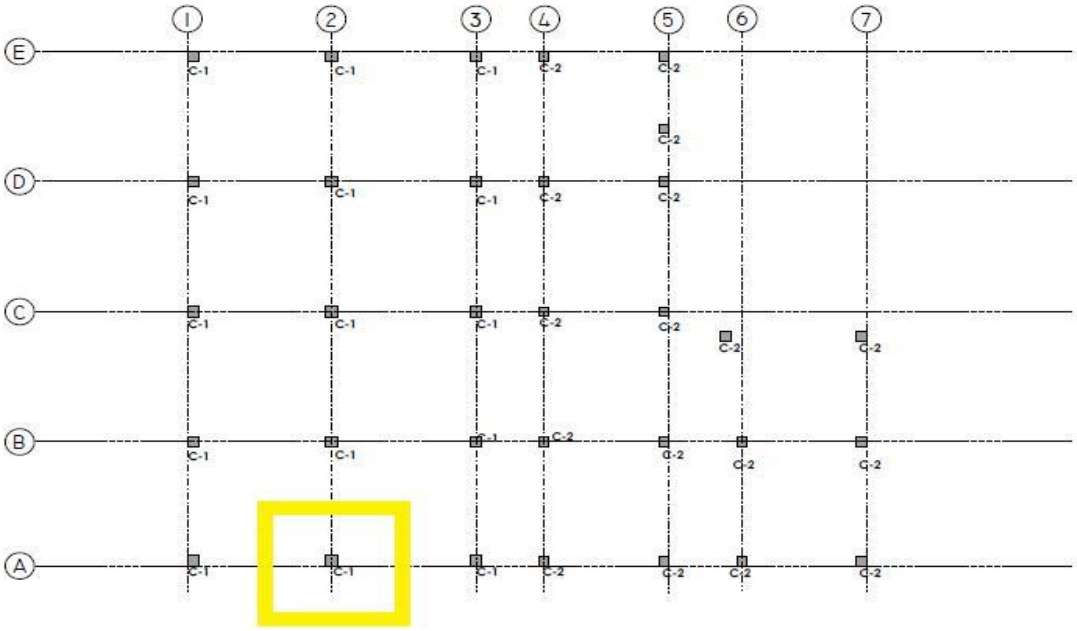


LOAD CASE 2 (LIVE LOADS ONLY)



Design of Column

C-1



P (dead)	162.94 kN
P (live)	150 kN
f'c	20.7
fy	289.6
ρ	0.02
Pu	370.398 KN
Mu	286.63 kN-m

LOAD COMBINATION: $1.2D + 1.0E + f_1L$

SEISMIC LOAD, E 99.87 kN

FACTORED LOAD

Pu 370.398 kN $1.2D + 1.0E + f_1L$

For Tied Columns:		Ag	30922.542 mm^2
ϕ	0.65	b	175.84806 mm
δ	0.8	Adopt b	400 mm
		Ag adopt	160000 mm^2

Main Bars:

As 3200 mm^2

20 mm Ø

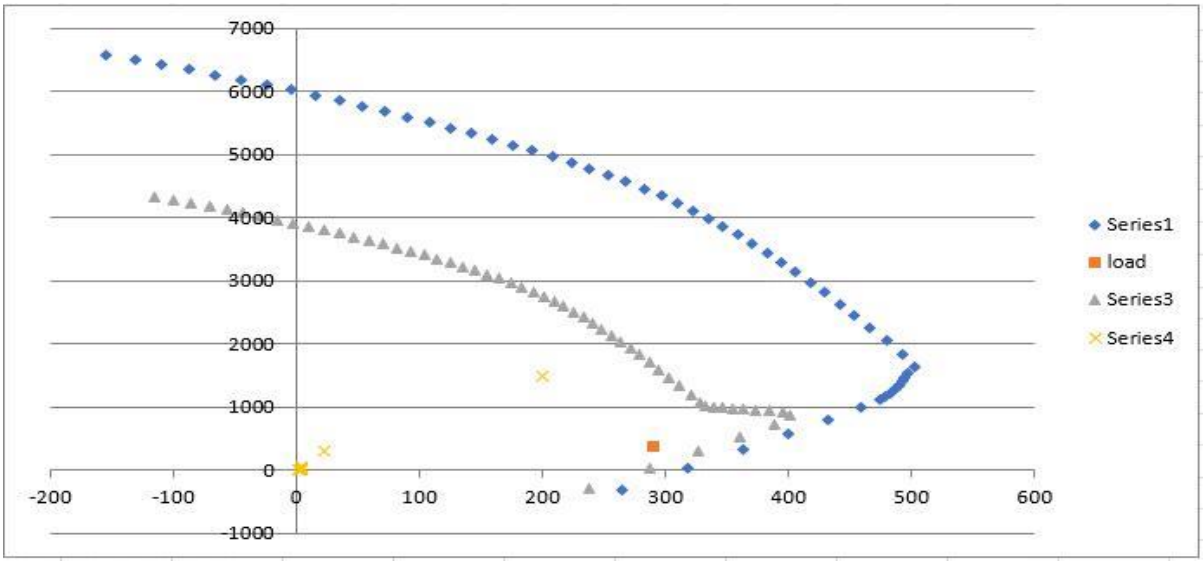
Ab 314.16

n 10.185893 **Adopt n** 12 pcs.

Therefore, Use 12 - 20mmØ Bar for 400mm x 400mm Column

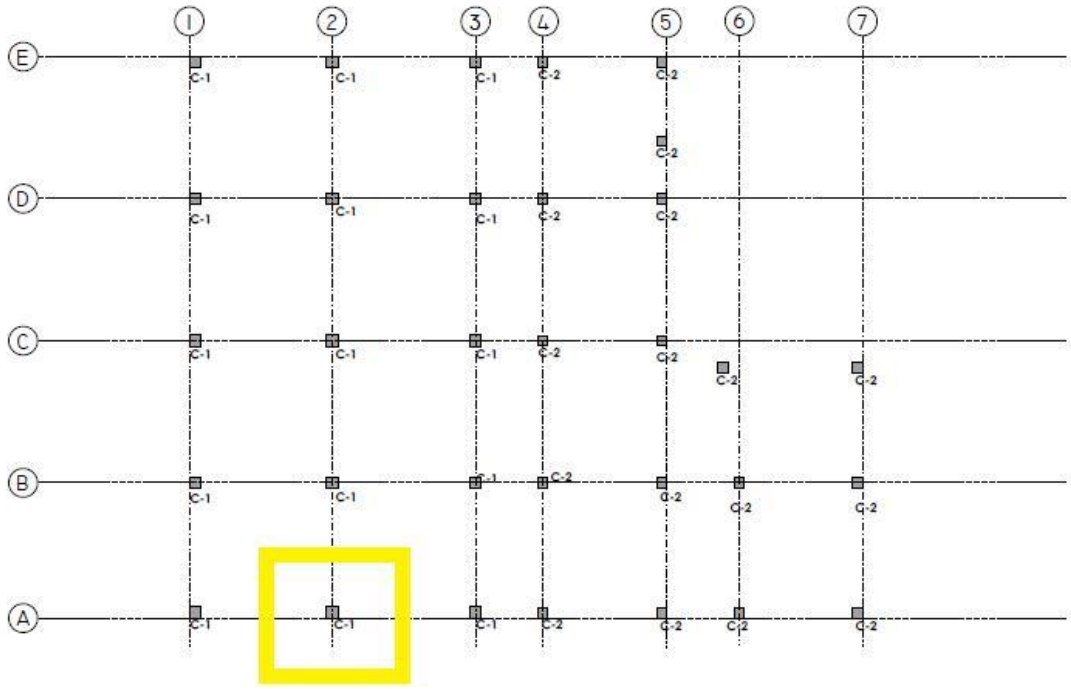
Ties: **10mmØ TIES 1@ 50, 7 @100, 5 @150, REST @ 250mm O.C.**

INTERACTION DIAGRAM



Design of Column

C-2



P (dead)	123.001 kN
P (live)	100.125 kN
f'c	20.7
fy	289.6
ρ	0.02
Pu	297.5337 KN
Mu	286.63 kN-m

LOAD COMBINATION: $1.2D + 1.0E + f_1L$

SEISMIC LOAD, E 99.87 kN

FACTORED LOAD

Pu 297.5337 kN $1.2D + 1.0E + f_1L$

For Tied Columns:		Ag	24839.492 mm^2
Φ	0.65	b	157.6055 mm
δ	0.8	Adopt b	400 mm
		Ag adopt	160000 mm^2

Main Bars:

As 3200 mm^2

20 mm Ø

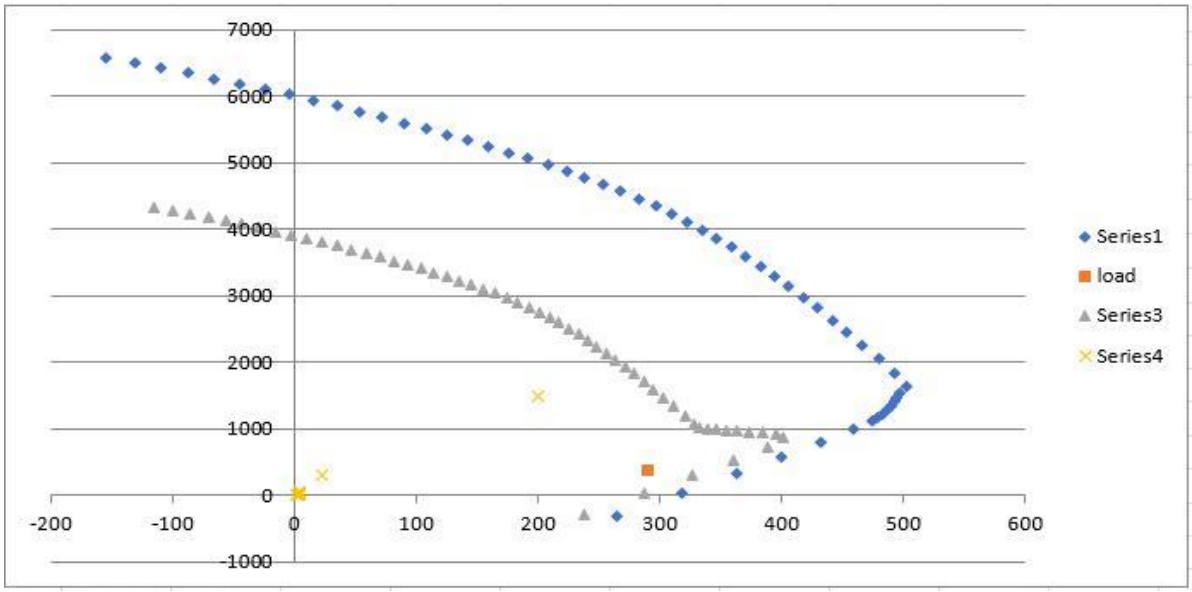
Ab 314.16

n 10.185893 **Adopt n** 12 pcs.

Therefore, Use 12 - 20mmØ Bar for 400mm x 400mm Column

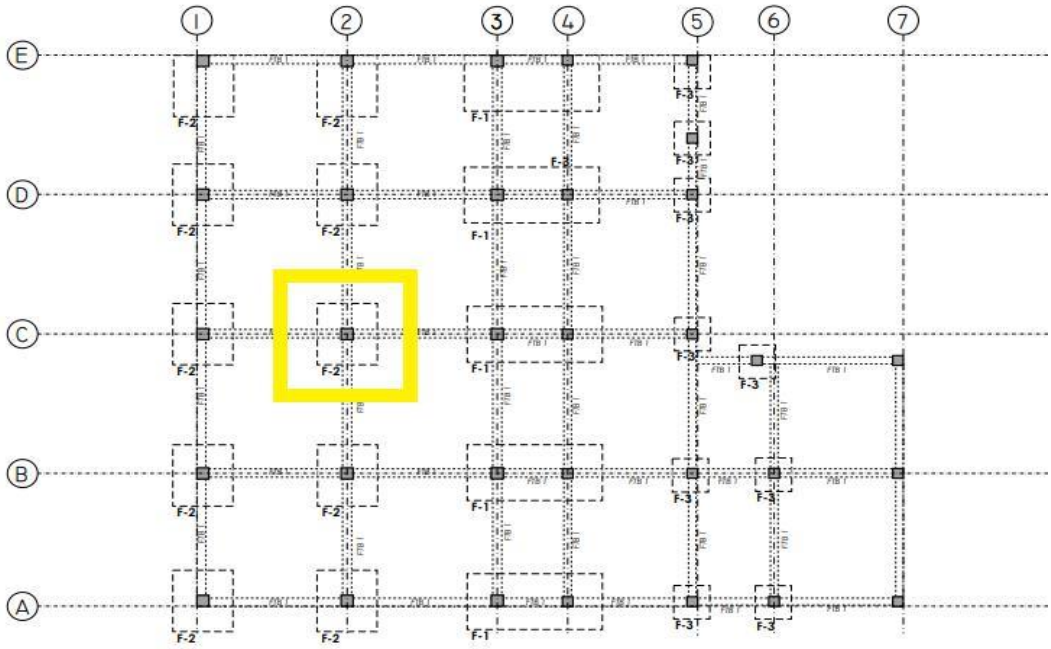
Ties: **10mmØ TIES 1@ 50, 7 @100, 5 @150, REST @ 250mm O.C.**

INTERACTION DIAGRAM



Design of Square Footing

F-2



Properties:

f'c	20.7 Mpa	Column (x)	400 mm
fy	289.6 MPa	DL	162.94 kN
	23.6 kN/m3	LL	150 kN
	18 kN/m3	Matt Bar	20 mm
qa	120 kPa	Cc	75 mm
		Pu	435.528 kN

Effective soil bearing capacity:

qe = 90.48 kPa

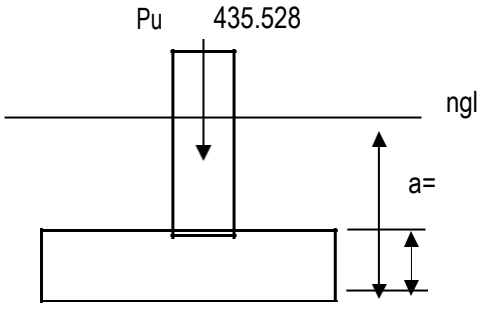
qu = 108.882 kPa

Dimension of Footing:

A = 3.4586649 mm2

S = **2** m

Eff Depth, **d =** **275** mm



Checking if footing design is safe,

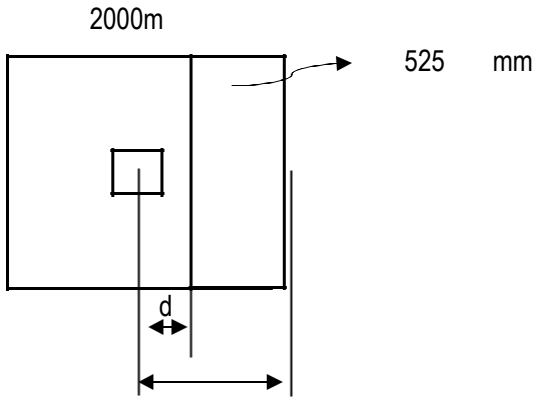
1. Based on wide beam shear,

Vu = 70773.3 N

Vc = 417058.15 N

*Check Vu < ϕVc

ϕVc = 354499.43 PASS



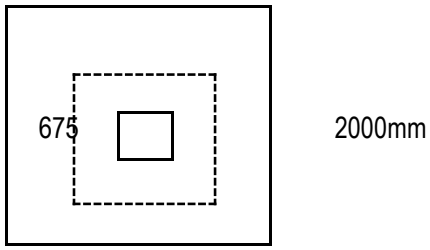
2. Based on two-way or punching shear,

Vu = 385918.64 N

Vc = 1126057 N

*Check Vu < ϕVc

ϕVc = 957148.45 , Pass



Rebars:

qu = 108.882 kPa x1 0.975

Mu = 65.397251 kN-m x2 0.775

Ru = 0.4804206 MPa

ρ = 0.0016822

ρmin = 0.0048343

Use ρ = 0.0048343

As = 2658.8398

Ab = 314.16

N = 8.4633301 say 9 pcs.

Development Length:

Ldb = 399.93854 mm

Or Ldb2 = 347.52 mm

Furnished Ld = 750 > 399.93854 OK

Checking if dowels or column bars extension are necessary,

Actual bearing strength, Pu = 265.3213248 kN

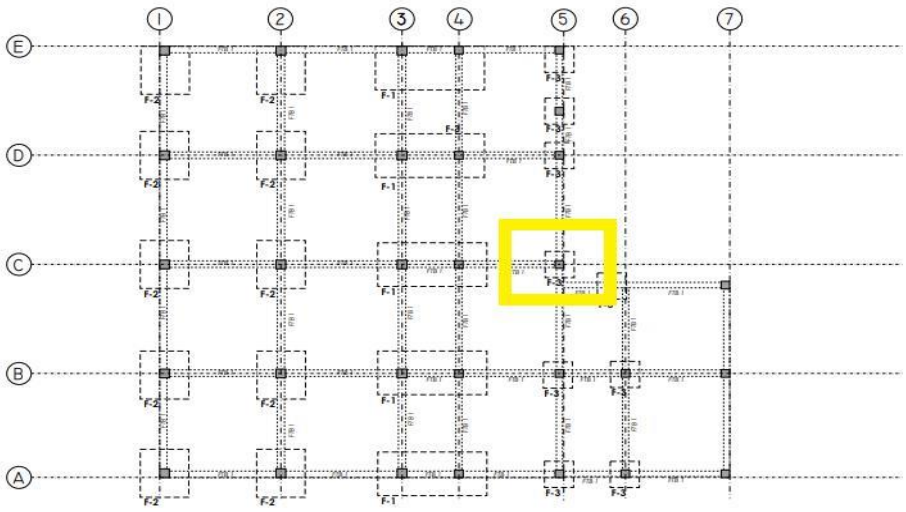
Permissible bearing, ϕ0.85f'cA1 = 1508.77125 kN x multiplier 5.7142857 <= 2

**use 2*

Permissible bearing, 3017.5425 > 265.32132 No need

Design of Square Footing

F-3



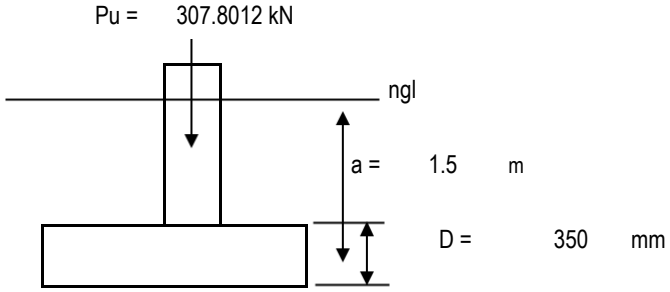
Properties:

f'c	20.7 Mpa	Column (x)	300 mm
fy	289.6 MPa	DL	123.001 kN
	23.6 kN/m3	LL	100.125 kN
	18 kN/m3	Matt Bar	20 mm
qa	120 kPa	Cc	75 mm
		Pu	307.8012 kN

Effective soil bearing capacity:

qe = 91.04 kPa

qu = 76.9503 kPa



Dimension of Footing:

S = 1.2

Eff Depth, **d = 225**

Checking if footing design is safe,

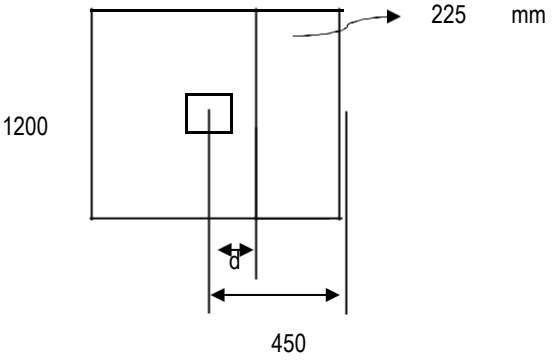
1. Based on wide beam shear,

Vu = 6925.527 N

Vc = 204737.637 N

*Check Vu < ϕVc

ϕVc = 174026.99 , Pass



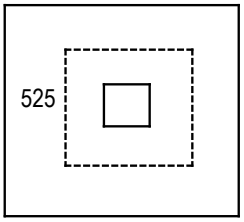
2. Based on two-way or punching shear,

Vu = 89599.00556 N

Vc = 716581.7295 N

*Check Vu < ϕVc

ϕVc = 609094.47 , Pass



Rebars:

qu = 76.9503 kPa

Mu = 8.339488763 kN-m x1 0.575

Ru = 0.152528372 MPa x2 0.425

ρ = 0.000529

ρmin = 0.0048343

Use ρ = 0.004834254

As = 1305.2486 N = 4.1547257

Ab = 314.16 say 5 pcs

Checking if dowels or column bars extension are necessary,

Actual bearing strength, Pu = 307.8012 kN

Permissible bearing, ϕ0.85f'cA1 = 1508.77125 kN x multiplier 5.7142857 <= 2

**use 2*

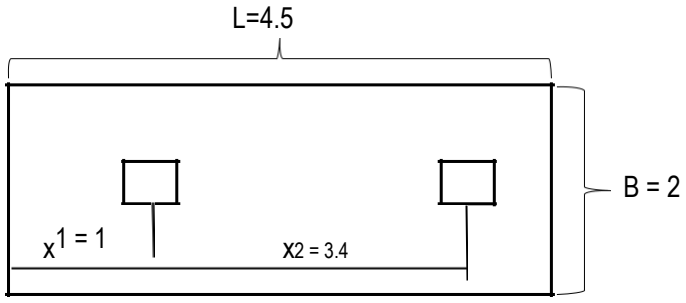
Permissible bearing, 3017.5425 > 265.32132 No need

Design of Combined Footing

F-1

f'c	20.7 Mpa	Main Bar	20 mm	
fy	289.6 MPa	d	275 mm	
	23.6 kN/m3	cover	70 mm	
	18 kN/m3	qe	80.42 kPa	
		qa	**120 kPa**	

Load (Unfactored)		
Column 1	216.913	kN
Column 2	216.913	kN
Total load	433.826	kN



x1	1 m
x2	3.4 m

Solving for L *(by moment at origin)*

L	4.4
	4.5
say	**m**

Height of soil above footing

a	1.5 m	Total Depth	355
h	1.15 m	say	**350 mm**

Footing Dimension

Footing area 6.598378513

B

= 1.466306336 say 2 m

Analysis of depth,

Load (Factored)		
Column 1	764.9748	kN
Column 2	265.3208	kN
Total load	530.6416	kN

qu **117.9203556** kPa

Column Dimensions:

C-1	0.4 x0.4
C-2	0.3 x0.3

For Two-way or Punching Shear

For Column 1,

A1	0.455625	bo	2.7
Vu	**711.247338**		
Vc	1126.057003 kN		

ϕVc 957.1484529

*Comparing ϕVc to Vu

ϕVc > 711.24734 Pass

For Column 2,

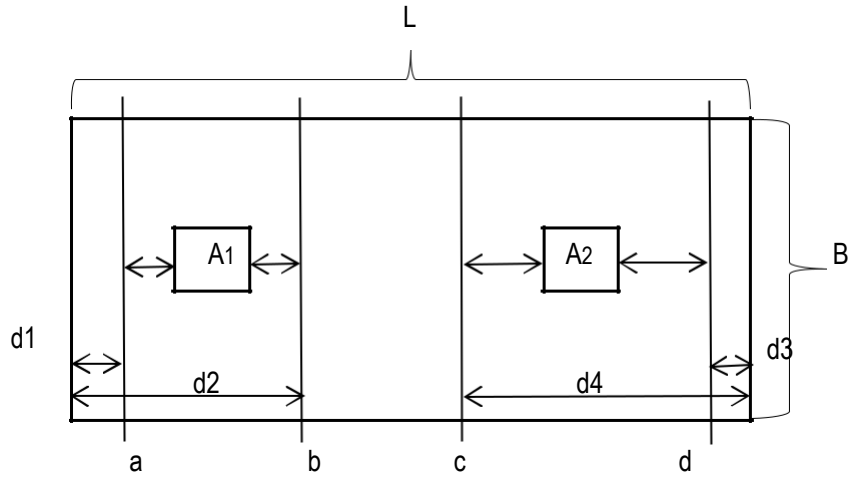
A1	0.330625	bo	2.3
Vu	**211.593338**		
Vc	959.2337437 kN		

ϕVc 815.3486821

*Comparing ϕVc to Vu

ϕVc > 211.59334 **Pass**

For One-way Shear:



d1 = 0.5 d3 = 0.5

d2 = 1.5 d4 = 1.5

Solving for the Vu:

at Section a, Vu = 117.93 kN

at Section b, Vu = -411.22 kN

at Section c, Vu = -88.45 kN

at Section d, Vu = 117.93 kN

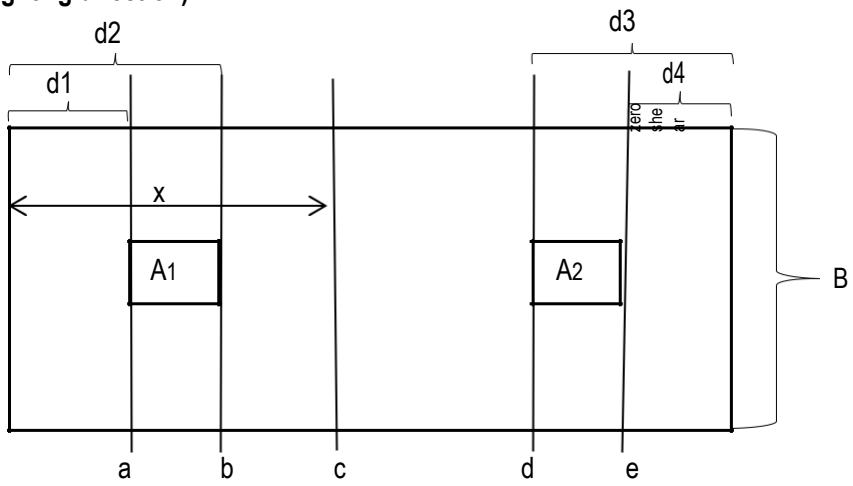
Use Vu, 117.93 kN

Vc 417.0581494 kN

ϕVc 354.499427

ϕVc > 117.93 **Pass**

Design of Rebars (Along long direction)



d1 =	0.85	d3 =	0.85
d2 =	1.15	d4 =	1.15

Solve for point of zero shear,

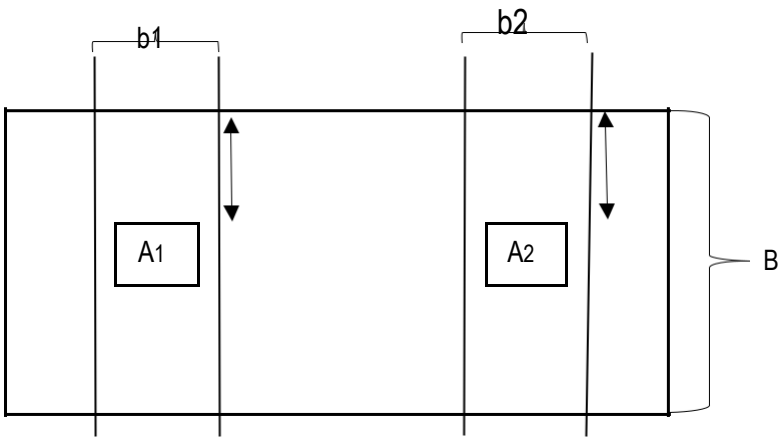
x = 3.243608

at Section a, Mu = 85.19746 kN-m
at Section b, Mu = 2.95471 kN-m
at Section c, Mu = -437.416 kN-m
at Section d, Mu = 45.39934 kN-m
at Section e, Mu = 155.9497 kN-m

β =	0.85	b =	2000 mm
ρb =	0.034831014	d =	275 mm
ρmax =	0.0261	Asb =	315 mm
ρmin =	0.0048		

	Section	a	b	c	d	e
Moment	Mu	85.197457	2.9547102	-437.4156225	45.39933689	155.94967
	Ru	0.6258766	0.0217059	-3.213337906	0.333512117	1.1456358
	ρ	0.002201	7.5E-05	-0.010233875	0.001162757	0.0040938
use	ρ	0.0048343	0.0048343	0.004834254	0.004834254	0.0048343
	As	2658.8398	2658.8398	2658.839779	2658.839779	2658.8398
Bars	N	9	9	9	9	9
	Location	Bottom	Bottom	Top	Bottom	Bottom

Design of Rebars (Along short direction)



b1 = 0.7 d1 = 0.85
b2 = 0.7 d2 = 0.85

at Column 1, Mu = 29.81911 kN-m
at Column 2, Mu = 29.81911 kN-m

Depth of Transeverse bars above longitudinal

d = 255 mm

	Section	Column 1	Column 2
Moment	Mu	29.81911	29.8191099
	b	0.7	0.7
	Ru	0.727903	0.72790343
	ρ	0.002568	0.00256774
use	ρ	0.0048	0.0048
	As	862.9144	862.914365
Bars	N	3	3
	Location	Bottom	Bottom

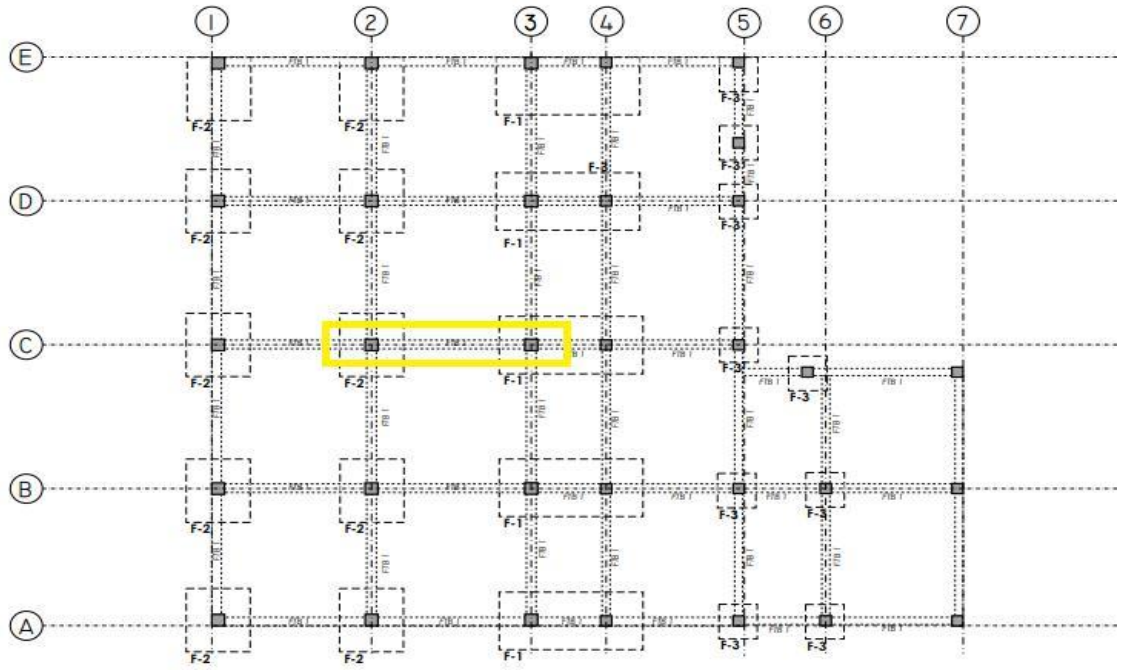
Shrinkage and Temperature Bars:

S&T Bar Ø 16
fy 275

assuming b = 1000 mm
Ast = 700 mm2
N = 4 bars
Spacing = 250 mm

Use 16 mm Bars at 250 OC as S&T Bars

Design of Beams - Singly Reinforced
Design of FTB



Material Properties	
f'c	**20.7** Mpa
fy	**289.58** Mpa
Y'c	**23.6** KN/m

Maximum moment value taken,
Maximum positive moment, Mu **45.6781 KN-m**
Maximum negative moment, Mu **30.4521 KN-m**

Assumed ρ=0.4ρbal $\rho bal = \frac{.85f'c(\beta 1)}{fy}(\frac{600}{600+fy})$ 0.01393 << use this

ρmax= $\left(\frac{.85f'c\beta}{fy}\right)(\frac{3}{8})$ 0.01937

ρmin= $\frac{1.4}{fy}$ 0.00483

In respect to Positive Moment Force,
Assumed d=1.50b
Solve for b $Mu = \phi bd^2(\rho f'y)(1-\frac{\rho f'y}{1.7f'c})$ 184.833 mm
b ≈ 250 **mm**

φ=.90

Solve for d , 277.25 mm

d ≈ 450 mm

Concrete cover = 50 mm

Total beam depth = 500 mm

Beam weight = 2.95 KN/m

2.95 > 2.95

Using 20 mm Ø RSB,

As = ρbd 1393.37 mm2

Ab= 314.16 mm2

n= 4.98962 ≈ 5 pcs

Checking for moment capacity,

T=C

Asfy=.85f'cab

solve for a: 103.409 mm

Mu(cap)=Φas(fy)(d-a/2) 163.056 KN-m

Mu(cap)>Mu .: OK

163.056 > 45.6781

In respect to Negative Moment Force,

Assumed d=1.50b

Solve for b 161.4666mm

$$Mu = \phi bd^2(\rho f'y)(1-\frac{\rho f'y}{1.7f'c})$$

b ≈ 250 mm

φ=.90

Solve for d , 242.2 mm

d ≈ 450 mm

Concrete cover = 50 mm

Total beam depth = 500 mm

Using 20 mm Ø RSB,

As = ρbd 1393.37 mm2

Ab= 314.16 mm2

n= 4.43522 ≈ 5 pcs

Checking for moment capacity,

T=C

Asfy=.85f'cab

solve for a: 124.091 mm

Mu(cap)=Φas(fy)(d-a/2) 190.587 KN-m

Mu(cap)>Mu .: OK

190.5868 > 30.452083

Vertical Stirrup Design:

Bar:	10 mm	fc:	20.7 Mpa
Vu:	37.32 kN	fy:	289.58 Mpa
φVc:	59.7151 kN	bw:	250 mm
(1/2)φVc:	29.8576 kN	$if\ Vs < \frac{1}{3}\sqrt{f'c}(bw)(d)$	$Smax = \frac{d}{2}\ or\ 600\ mm$
Av:	157.08		
d w/o cover	420 mm	Vs:	-29.8602
Clear span length of	5 m	$\frac{1}{3}(\sqrt{f'c})(bw)(d)$	159.24

Spacing, mm

D from Support	Vu, KN					
0.42	31.0502	38.2199	499.861	545.847	639.859	210
1.00	22.392	49.7642	383.903	545.847	639.859	NSN
1.50	14.928	59.7162	319.924	545.847	639.859	NSN
2.00	7.464	69.6682	274.223	545.847	639.859	NSN
2.50	0	79.6202	239.947	545.847	639.859	NSN
3.50	14.928	59.7162	319.924	545.847	639.859	NSN
4.50	29.856	39.8122	479.869	545.847	639.859	NSN
5.00	37.32	29.8602	639.803	545.847	639.859	210

* if Vu < 1/2(ϕ)(Vc) = no stirrups needed (NSN)

10mm stirrups spaced at 1@50mm, 10@100mm, rest @ 250mm OC

Design of Stairs

Design Criteria :

Materials strenght:

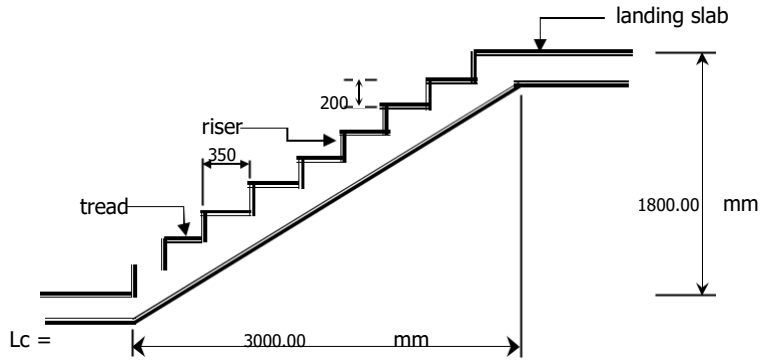
fc'	=	20.7 mPa
fy	=	289.58 mPa
unit weight of concrete	=	23.6 kN/m^3
b	=	1.1

Service load:	**kPa**
Live load.....	1.90
Miscellaneous live load.....	0.50
Floor finish and toppings.....	1.10
Miscellaneous dead load.....	0.50
tread.....	0.250
riser.....	0.200
Lc.....	1.100
h_{min}.....	0.100

A. estimate the thickness of the slab

minimum thickness for simply supported slab to control deflection

(NSCP 5th edition, Table 409-1)



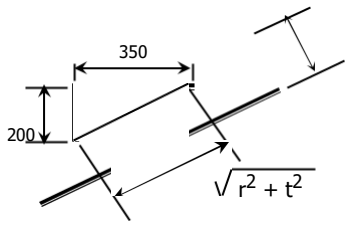
Typical Stair

h_{min} = Lc/20 = 2250/20 = 150.00 mm

say: **h_{min} = 150** mm

1. Service loads

a. service dead load



WDL = Wstep + Wslab + Wfloor finish +Wmiscellaneous dead load

where:

W_{stem} = 1/2 (r) wc =1/2 (200)(24) = **2.36** kPa

$W_{slab} = h/t \sqrt{r^2 + t^2}$ (Wc) = $\frac{0.125 \quad 24) \quad (0.2)^2 + (0.25)^2}{0.25}$

W_{slab} = **3.02 kPA**

WDL = (2.4)+ (3.8419)+ (1.1)+ (0.5) = **6.9823** kPa

b. service live load

$W_{ll} = W_{ll\ stair} + W_{miscellaneous\ live\ load}$
$W_{ll} = 1.9 + 0.50$
$W_{ll} = 2.4$ kPa

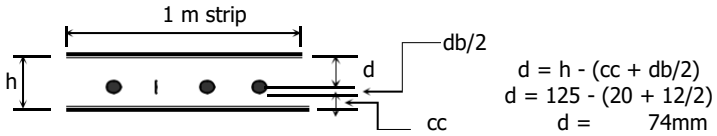
2. Factored loads

$W_u = 1.4(DL) + 1.7(LL)$
$W_u = 13.855$ kPa

note:
Anlyze 1m strip of stair slab

3. Compute for the required effective depth of the stair slab.
As required by the minimum thickness requirements of the ACI code.

note:
a) use a 12mmf main bars.
b) use a 20mm minimum concrete cover.



$d = h - (cc + db/2)$
$d = 125 - (20 + 12/2)$
$d = 74$mm

MOMENT STRENGHT :
$M_u = 1/8\ W_u L_c^2 = 1/8\ (13.983)\ (2250)^2$
$M_u = 2.0956$ kN-m

4.Compute for ρ_{min} and ρ_{max}

$\rho_{min} = 1.4/fy =$ **0.00483** **use!**
$\rho_{min} = \sqrt{fc'} / 4(fy) = 0.003928$

$$\rho_{max} = \frac{(0.75) \times \{(0.85)\ (fc')\ (b)\ (600)}{fy\ (fy + 600)}$$

$\rho_{max} =$ **0.03381**

5. Compute for W

$Mu = f\ bd^2 fc'w\ (1-0.59w)$

Mu = 2095597N-mm
f = 0.9
b = 1000 mm
d = 74 mm
fc' = 20.7mPa
$w - 0.59\ w^2$ = 0.020541
w = 1.674119
w = 0.020797 ← **use!**

6. Compare for $\mathbf{r_{act} = \frac{w\ fc'}{fy}}$

$\mathbf{r}_{act}$ = 0.001487 > $\mathbf{r}_{min}$ **ok!**
< $\mathbf{r}_{max}$

7. Reinforcements:

A. Main bars

As = rbd r = 0.001487
b = 1000 mm
d = 74 mm

As = 110.009 mm^2

using 12mmf :
(1000/s)(p*12^2/4) = 335.0006

S = 1027.556 > 3h
therefore use 3h spacing = 450 mm

use : 150mm

therefore, use 12 mmf main steel bars spaced @ 150 mm O.C

B. Temperature bars

Ast = 0.0018bh mm
Ast = 0.0018(1000)(100) mm
Ast = 270 mm^2

using 10mmf :
(1000/s)(p*10^2/4) = 180

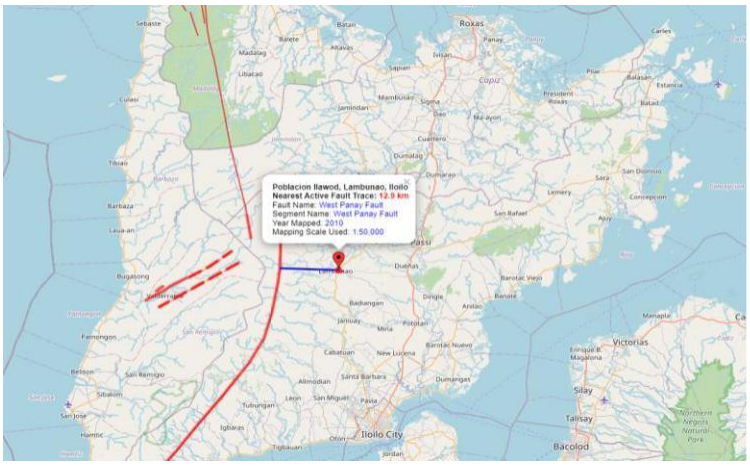
S = 290.7407 < 5h (ok)
therefore use actual spacing = 290.7407 mm
use : 200mm

therefore, use 10 mmf temperature bars spaced @ 200 mm O.C

APPENDIX J
PORTAL METHOD

Title: Proposed Two Storey SK Building with Local Youth Development Council

Occupancy Category: Standard Occupancy Structures (IV)



Seismic Source Type A
Lambunao, Iloilo

Zone	4
Na	1
Nv	1.2

Dead Loads:	Concrete Unit Weight	= 23.60	kN/m3
	Ceramic Tile	= 1.10	kPa
	Fiber Cement Board	= 1.10	kPa
	Ceiling	= 0.10	kPa
	MEP	= 0.10	kPa
	Interior Partition	= 1.00	kPa
Live Load	2nd Flr	= 4.80	kPa
	Roof Deck	= 1.90	kPa
	Roof	= 1.00	kPa

PARAMETERS	
Z	0.4
I	1
Rwx	8.5
Rwz	8.5
Na	1
Nv	1.2
S	4
Ct	0.0731
hn	8.18
W	480.368
Cv	0.64
Ca	0.44

T = Ct (hn)0.75 sec
= 0.353575655 sec
< 0.70 sec therefore Ft = 0;

V = CvIW / RT KN
= 943.30 KN

Total design base shear need not exceed:

$$V = \frac{2.5 Ca\ IW}{R} \text{ KN} \quad \text{eq1}$$

= 573.25 KN

Design base shear shall not be less than:

V = 0.11CaIW KN eq2
= 214.39 KN

$$V = \frac{0.8 ZNvIW}{R} \text{ KN} \quad \text{eq3}$$

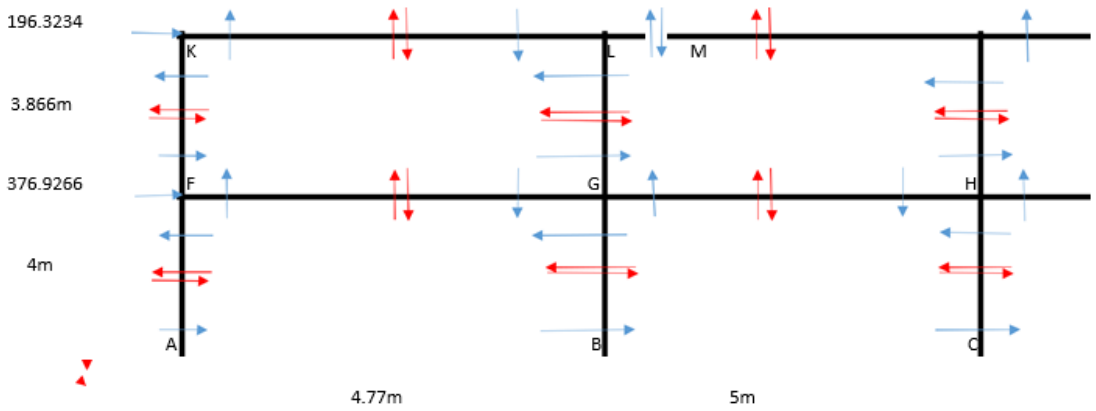
= 200.12 KN

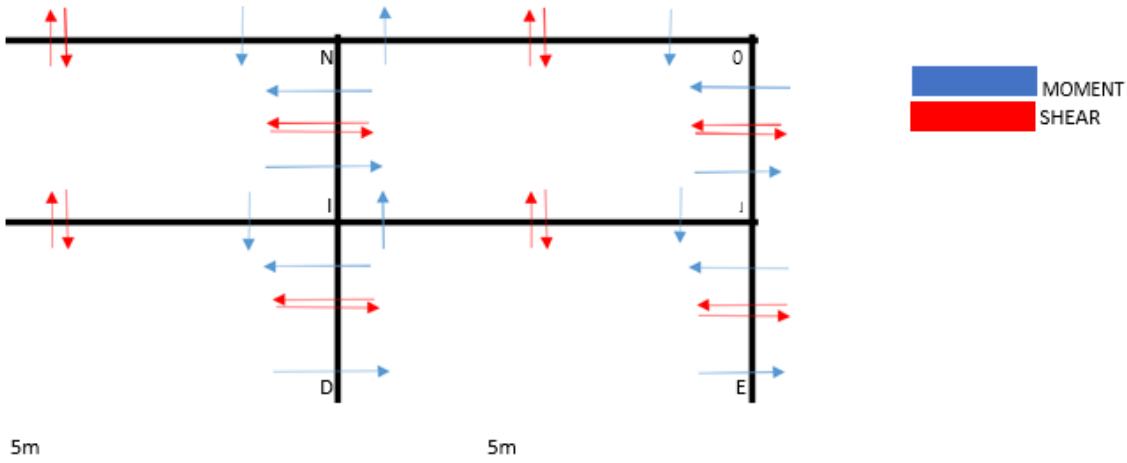
If Ft≠ 0:
Ft = 0.07TV
= 2.531821929 KN
< 0.25V = 25.5736532 kN

Since V = 1535.06 kN exceeds V=932.87 kN(eq1),

Use V = 573.25 kN

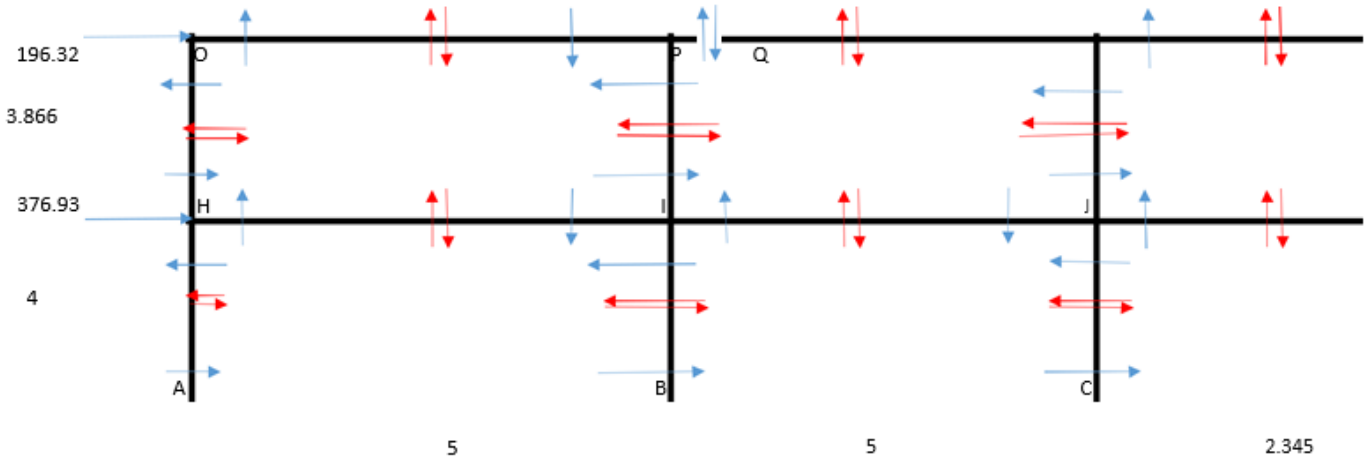
Level	Wx	hx	Wxhx	Wxhx/Σ(WiHi)	(V-Ft)	Fx
Roof	1551.21	3.87	5996.98	0.34	573.25	196.32
2	2878.44	4.00	11513.76	0.66	573.25	376.93
	4429.65		**17510.74**	**1.00**		

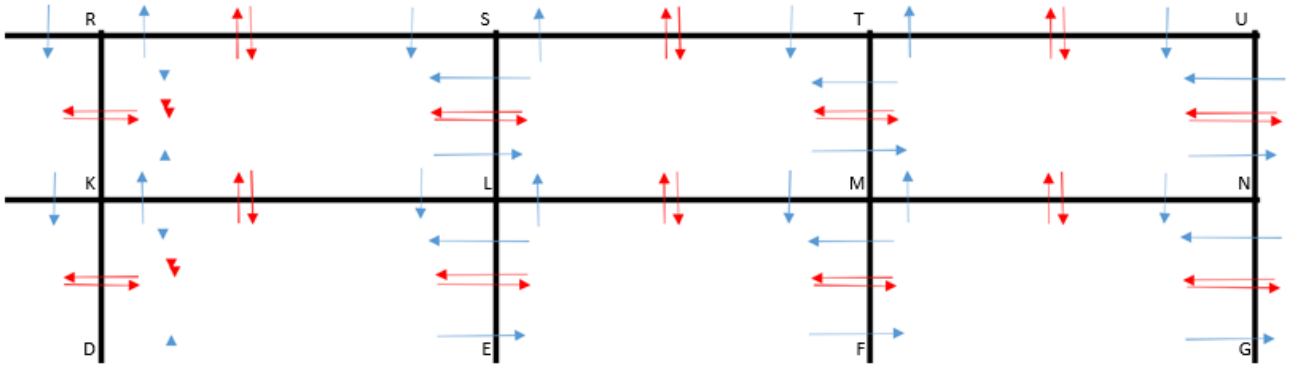




GIRDER	MOMENT (kN-m)	SHEAR (kN)
KL	47.44	19.89
LM	47.44	18.97
MN	47.44	18.97
NO	47.44	18.97
FG	190.75	79.98
GH	190.75	76.30
HI	190.75	76.30
IJ	190.75	76.30

COLUMN	MOMENT (kN-m)	SHEAR	AXIAL FORCE (KN)
KF	47.44	24.54	19.89
LG	94.87	49.08	0.91
MH	94.87	49.08	0.00
NI	94.87	49.08	0.00
OJ	47.44	24.54	18.97
FA	143.31	71.66	99.87
GB	286.63	143.31	4.59
HC	286.63	143.31	0.00
ID	286.63	143.31	0.00
JE	143.31	71.66	95.27





MOMENT (kN-m)	SHEAR (kN)	COLUMN	MOMENT (kN-m)	SHEAR	AXIAL FORCE (KN)
31.62	12.65	OH	31.62	16.36	12.65
31.62	12.65	PI	63.25	32.72	0.00
31.62	26.97	QJ	63.25	32.72	14.32
31.62	14.61	RK	63.25	32.72	12.36
31.62	24.80	SL	63.25	32.72	10.20
31.62	14.61	TM	63.25	32.72	10.20
127.17	50.87	UN	31.62	16.36	14.61
127.17	50.87	HA	95.54	47.77	63.52
127.17	108.46	IB	191.08	95.54	0.00
127.17	58.74	JC	191.08	95.54	71.91
127.17	99.74	KD	191.08	95.54	62.08
127.17	58.74	LE	191.08	95.54	51.20
		MF	191.08	95.54	51.20
		NG	95.54	47.77	73.34

APPENDIX K GEOTECHNICAL INVESTIGATION

SPECIFIC GRAVITY:

Calibration of Pycnometer:

W_{pw} = density (at T_x)/density (at T_i) x (W_{pw}(at T_i) - W_p) + W_p

Specific gravity

$G_s = KW_s/(W_s + (W_{pw}$ at $T_x) - W_{pws})$

Table 1 – Relative Density of Water and Conversion Factor K for Various Temperatures

Temperature (^{0}C)	Relative Density of Water	Conversion Factor, K
18	0.9986244	1.0004
19	0.9984347	1.0002
20	0.9982343	1.0000
21	0.9980233	0.9998
22	0.9978019	0.9996
23	0.9975702	0.9993
24	0.9973286	0.9991
25	0.9970770	0.9989
26	0.9968156	0.9986
27	0.9965451	0.9983
28	0.9962652	0.9980
29	0.9959761	0.9977
30	0.9956780	0.9974

MOISTURE CONTENT:

MASS OF SOIL, MS = (wt. of dry soil + can) – (wt. of can)

MASS OF POREWATER, MS = (wt. of wet soil + can) – (wt. of dry soil +can)

MOISTURE CONTENT, W% = (MW/MS)x100%

	WT. OF CAN (g), M1	WT. OF WET SOIL + CAN (g), M2	WT. OF DRY SOIL + CAN (g), M3	MASS OF SOIL, MS (g)	MASS OF POREWATER, MW (g)	MOISTURE CONTENT %
TRIAL 1	9.7	146.2	105.5	40.7	95.8	42.48434238
TRIAL 2	10.5	149.1	108.5	40.6	98	41.42857143
TRIAL 3	11.1	138.3	99.7	38.6	88.6	43.56659142

AVE. MOISTURE CONTENT%	42.49316841

Wt. of Pycnometer, Wp	Mass of soil, Ws	Wt. of Pycnometer + water, Wpw	Wt. of Pycnometer + water + soil, Wpws	Observed temperature, Ti	Temperature of contents of pycnometer when Wpws was determined, Tx
87.4	100	334.4	392	29	27

Wpw (at Tx)
334.5411108

SPECIFIC GRAVITY, Gs
2.34667121

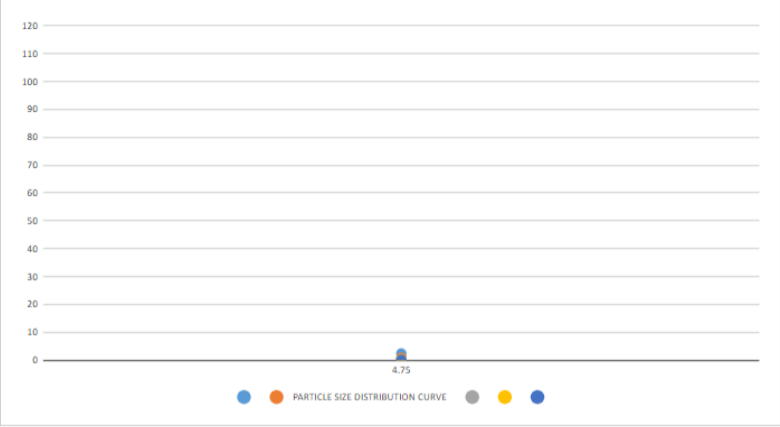
UNIT WEIGHT:

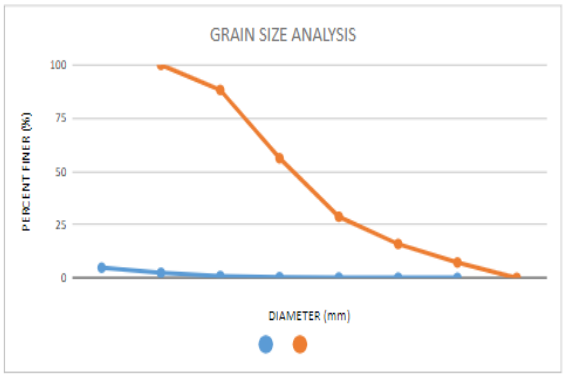
Mass of soil, Ms = (Wt. of can and soil) – (Wt. of can)

Volume of soil, Vs = (Volume of water and soil) – (Volume of water)

WT. OF SOIL, Ws (g)	VOLUME OF WATER	VOLUME OF WATER AND SOIL	VOLUME OF SOIL, Vs	UNIT WEIGHT	
71.6	150	170	20	3.58	g/ml

35.1198





SIEVE ANALYSIS										
Sieve Size	Diamater (mm)	Weight of each sieve (g)	Weight of Sieve + Soil (g)	Weight Retained (g)	Percent Passing (%)	Percent Retained (%)	Percent Finer	Remarks		
No. 4	4.75	356.5	358.6	2.1	0.2104630186	0.2104630186	100	GRAVEL		
No. 10	2.36	365.6	480.8	115.2	11.54539988	11.7558629	88.2441371	SAND	COARSE SAND	11.54539
No. 20	0.85	377.6	697.7	320.1	32.08057727	43.83644017	56.16355983	SAND		
No. 40	0.3	345.9	619.9	274	27.46041291	71.29685308	28.70314692	SAND	MEDIUM SAND	27.46041
No. 100	0.15	321.6	449.2	127.6	12.78813389	84.08498697	15.91501303	SAND		
No. 200	0.075	309.1	396	86.9	8.709160152	92.79414712	7.205852876	SAND	FINE SAND	8.709160
Pan	0	227.3	299.2	71.9	7.205852876	100	0	SILT		
TOTAL				997.8	100					

PERCENT FINE (passing through #200 sieve) =	7.205852876	%
PERCENT GRAVEL (retained on no.4) =	0.2104630186	%
PERCENT SAND (100%-%Passing #200-%Gravel)	92.58368411	%

RESULTS					
%gravel	0.2104630186	D60(mm)	1.03057732	Cu = D60/D10	12.78328628
%sand	92.58368411	D30(mm)	0.325974452	Cc = D30^2/D10*D60	1.278935031
%fine	7.205852876	D10(mm)	0.0806191222		

SOIL CLASSIFICATION		
DUAL CLASSIFICATION	SW - SM	Well-graded sand with silt

SW –SM KAY Cu > 6 and Cc > 1 and its %gravel is less than 15%

10	60		1.03057732	0
1.03057732	60		1.03057732	60

10	30		0.3259744526	0
0.3259744526	30		0.3259744526	30

10	10	0.08061912226	0
0.08061912226	10	0.08061912226	10

How to classify soil using USCS?

% passing #200 (0.075 mm)	% passing #4 (4.75 mm)	% passing #200 (0.075 mm)			USCS Symbol	USCS Name
<50%	>50%	0-5%	C_u>6 and 1<C_c<3?	yes	SW	Well-graded sand
				no	SP	Poorly-graded sand
		5-12%	Dual classification		SP-SM	Poorly-graded sand with silt
					SP-SC	Poorly-graded sand with clay
					SW-SM	Well-graded sand with silt
					SW-SC	Well-graded sand with clay
		12-50%	PI>0.73(LL-20) %?	yes	SC	Clayey sand
				no	SM	Silty sand
	<50%	0-5%	C_u>4 and 1<C_c<3?	yes	GW	Well-graded gravel
				no	GP	Poorly-graded gravel
		5-12%	Dual classification		GP-GM	Poorly-graded gravel with silt
					GP-GC	Poorly-graded gravel with clay
					GW-GM	Well-graded gravel with silt
					GW-GC	Well-graded gravel with clay
		12-50%	PI>0.73(LL-20) %?	yes	GC	Clayey gravel
				no	GM	Silty gravel

% passing #200 (0.075 mm)	LL>50%?	PI>0.73(LL-20) %?	USCS Symbol	USCS Name
>50%	yes	yes	CH	Fat clay
		no	MH	Elastic clay
	no	yes	CL	Lean clay
		no	ML	Lean silt

Soil 1. G=26%, S=72%, F=2%
C_c=1.05, C_u=10

Soil 2. G=26%, S=65%, F=9%
C_c=0.9, C_u=10

Well graded soil

Gravels: C_c = 1-3 & C_u >4

Sands: C_c = 1-3 & C_u >6

Table 09.1 - Terzaghi's Bearing-Capacity Factors for General Shear Failure

$\phi°$	N_c	N_q	N_γ	$\phi°$	N_c	N_q	N_γ
0	5.70	1.00	0.00	26	27.09	14.21	9.84
1	6.00	1.10	0.01	27	29.24	15.90	11.60
2	6.30	1.22	0.04	28	31.61	17.81	13.70
3	6.62	1.35	0.06	29	34.24	19.98	16.18
4	6.97	1.49	0.10	30	37.16	22.46	19.13
5	7.34	1.64	0.14	31	40.41	25.28	22.65
6	7.73	1.81	0.20	32	44.04	28.52	26.87
7	8.15	2.00	0.27	33	48.09	32.23	31.94
8	8.60	2.21	0.35	34	52.64	36.50	38.04
9	9.09	2.44	0.44	35	57.75	41.44	45.41
10	9.61	2.69	0.56	36	63.53	47.16	54.36
11	10.16	2.98	0.69	37	70.01	53.80	65.27
12	10.76	3.29	0.85	38	77.50	61.55	78.61
13	11.41	3.63	1.04	39	85.97	70.61	95.03
14	12.11	4.02	1.26	40	95.66	81.27	115.31
15	12.86	4.45	1.52	41	106.81	93.85	140.51
16	13.68	4.92	1.82	42	119.67	108.75	171.99
17	14.60	5.45	2.18	43	134.58	126.50	211.56
18	15.12	6.04	2.59	44	151.95	147.74	261.60
19	16.56	6.70	3.07	45	172.28	173.28	325.34
20	17.69	7.44	3.64	46	196.22	204.19	407.11
21	18.92	8.26	4.31	47	224.55	241.80	512.84
22	20.27	9.19	5.09	48	258.28	287.85	650.67
23	21.75	10.23	6.00	49	298.71	344.63	831.99
24	23.36	11.40	7.08	50	347.50	415.14	1072.80
25	25.13	12.72	8.34				

SOIL BEARING CAPACITY

Depth	5	ft	
Angle of friction	20	deg	
Unit weight, y	112.7892	pcf	
Nq	7.44		
Ny	3.64		
Nc	17.69		
B, square footing	3.937	ft	
q=yD	563.946	psf	
Cohesion, C	2429.5	psf	
F.S.	3		
Qu=1.3CNc+qNq+0.4ByNy	22794.094		
Qnet=Qu-q	22230.148		
Qa=Qu/FS	7598.0315	psf	363.7957 kPa
Ultimate Load Capacity	563.946	psf	

APPENDIX L
DESIGNER'S VITAE

Bulusan, Princess Shazeen R.

A 22-year-old with aspirations of becoming a civil engineer believed that "it is what it is." Princess Shazeen Bulusan, born on November 11, 2000, born in Manila. Presently, she lives in Sitio Bongol, Brgy. Abaca, Tobias Fornier, Antique. Princess is the youngest child of Sonny S. Bulusan and Helen R. Bulusan. She has two siblings, one of whom is a teacher and the other an information technology professional.

She cherished her four kitties tremendously. She loves singing in karaoke, binge-watching korean dramas and runningman, and eating.

She successfully completed her primary education at Dao Central School situated in Tobias Fornier, Antique.During her junior years, she received her education at Concepcion L. Cazenas Memorial School, and for her senior years, she attended Dao Catholic High School Inc. Currently, she is enrolled in Central Philippines University, pursuing a Bachelor of Science in Civil Engineering. Furthermore, she held the position of local secretary for the Philippine Institute of Civil Engineers-CPU Chapter in the academic year 2021-2022, and served as the local ambassadress for PICE-CPU in the year 2022-2023. She aspires to build a home for her cats, travel the world, and enjoy life with her family and friends.

Gavilan, Ariel J.

In the city of love, Iloilo City, Ariel Gavilan was born on September 14, 1999. He is the youngest of Mr. Alan U. Gavilan's and Mrs.Dyenina J. Gavilan's three children. He is currently residing in Blk 6 Lot 23 Villa Christina Subdivision, Brgy. Cagbang, Oton, Iloilo.

He is an animal lover. His cats and dogs, who are devoted pals, are always with him. He manages to fit in video game time with his friends despite his hectic schedule. He enjoys taking photos as a hobby to preserve memories.

He successfully finished his primary schooling at Holy Rosary Academy, which is located in Molo, Iloilo. He attended Hua Siong College in Iloilo for his junior year of study, and University of San Agustin for his senior year. Currently, he is pursuing a Bachelor of Science degree in Civil Engineering at Central Philippines University. Additionally, in the academic year 2021-2022, he held the position of Vice President for the 3rd Year in the Philippine Institute of Civil Engineers-CPU Chapter. Moreover, from 2019 to 2020, he served as the head photographer for CPU Engineer. His aspiration is to explore various parts of the world someday.

Inocencio, Edsyl James S.

The unique one, Edsyl James Inocencio is 23 years old born on April 1, 1999 at Kalibo, Aklan. He resides in Aklan's Old Buswang Kalibo. Both Sarah Jane Inocencio and Eduardo Inocencio Jr. are his parents. Two lovely kids were born as a result of his parents' love. Eduardo Inocenio III, who is currently employed, is his brother. He has a gorgeous and brave dog. He enjoys watching Korean dramas, working out to tone up muscle, and playing basketball with his pals. In the future, he plans to become a licensed engineer and explore the world.

His elementary education was completed at Aklan InterFaith Academy. At Sto. Nino Seminary, he finished both his junior and senior years of high school. He is now studying in the Bachelor of Science in Civil Engineering (Bridging Program) course at Central Philippines University.

Losaria, Lovelyn Q.

Lovelyn Losaria, who is as charming as her name, is a 23-year-old living in Poblacion Ilawod, Lambunao, Iloilo. She was conceived on February 18, 1999. She is the youngest daughter of Noede C. Losaria, Sr. and Ma. Rowena Q. Losaria. She grew up with her siblings, Jed Saunders Q. Losaria, Cheryl Q. Losaria, and Noede Q. Losaria, Jr.

She is actively participating in community development in Lambunao. She is a local youth leader who aspires to help her peers. She is a very busy person who barely has time for herself.

During her elementary school years, she attended Harvester Christian Academy. She also loved her studies at Lambunao National High School when she was in junior and senior high school. For her Bachelor of Science in Civil Engineering (Bridging Program) degree, she is now putting a lot of effort into her studies at Central Philippine University. During the school year 2021-2022, she served as the local vice president of the Philippine Institute of Civil Engineers – CPU Chapter. She wants to eventually work in the engineering industry and achieve that by passing the board examinations.

Palma, Arje A.

A man with hopes of being an engineer and entrepreneur was born on May 31, 2000 in Iloilo City. Arje Palma is the 22-year-old son of Ariel P. Palma and Jesusa Palma. He has a sister named Nicole Tsan Palma. He is presently residing at Brgy. Cruz, Barotac Nuevo, Iloilo.

He enjoys playing online games, reading books that interest him, and playing volleyball. Whenever he has free time, he always plans to hang out with his pals. Additionally, he owns a couple of cats and a dog.

He attended Barotac Nuevo Central Elementary School for elementary school and St. Paul School Barotac Nuevo for both junior and senior high school. Currently, he is working towards a Bachelor of Science in Civil Engineering at Central Philippine University. During 2021-2022, he served as a local auditor for the Philippine Institute of Civil Engineers – CPU Chapter. His ultimate purpose is to help others, particularly his family and friends.