

Designing the Playscape: An Interactive Learning Resource Center that Encourages Creative Learning

by

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A practicum submitted to the Faculty of Graduate Studies of
the University of Manitoba
in partial fulfillment of the requirements of the degree of

MASTER OF INTERIOR DESIGN

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Abstract

Human civilization and society have grown exponentially over the last millennia through the help of innovation and technology. What, then, propels innovation and technology? Throughout history, humans have used their imagination and creativity to make new things, tools, devices, and buildings to make life easier and advance civilization. The knowledge to create and use these tools is taught to the next generation through educational services and facilities such as learning resource centers. At its core, a learning resource center is usually a library that provides and encourages audiovisual aids, other tools, and books to support the educational system. The research in this practicum aims to define the connection between creativity and education through play and to study the typologies of learning resource centers/libraries and playful areas/third places such as playgrounds. As society is ever-evolving and growing, so too must its inhabitants. While the education system can teach people how to use sophisticated tools, the system could be improved with more opportunities to teach it creatively. Thus, this practicum aims to introduce a dynamic approach to designing learning resource centers by creating playful environments. The research focuses on exploring the concepts of play, interactive design, and maker spaces and using them to iterate a new design typology. This practicum will design an interactive learning resource center as a hub for individuals seeking growth, collaboration and learning through play. The project aims to contribute to the design industry by studying the outcome of combining two distinct typologies: learning resource centers (LRC) and playful areas, such as playgrounds. The research will provide various techniques and tools to create environments that promote learning through play.

ACKNOWLEDGEMENTS

Throughout this project and the duration of my time in the faculty there have been a great amount of people who have helped me though this journey.

I would first like to thank my graduating committee. I would like to thank and acknowledge my advisor Jason Shields, for supporting my topic and guiding me through the practicum process step by step. Thank you for not giving up on me and for chasing me down whenever I fell behind or lost focus. Thank you for your immense patience with me and for always helping me and providing me with feedback on extremely short notices. Your dedication to creating a positive and enriching learning experience has made a significant impact on my academic career. Your willingness to go above and beyond to assist students whether it be clarifying and helping to understand complex subjects or offering design advice and guidance, has been instrumental in my project.

I would like to acknowledge and thank the rest of my advisory committee. To my internal advisor, Cynthia Karpan, I would like to express my sincere gratitude for the opportunity to work with you during this practicum project. Your expertise and insights greatly enriched my understanding of my topic and helped me to think more critically. I truly appreciate the time and effort that you have given me and for sharing your knowledge.

To my internal advisor, Paulo Castillo, thank you for your exceptional guidance and support during my practicum project. Your mentorship in helping me develop the architectural design language was invaluable and I am truly fortunate to have you as my external advisor. Thank you for being an exceptional mentor and for the time and effort you put in to helping me throughout this journey. I am inspired by your dedication to help others achieve and realize their potential, and I will carry the lessons I have learned from you into my future endeavors.

I would like to acknowledge and thank my family who have supported me throughout my entire education and time in the faculty. Whether it be assistance with funds for tuition, to helping me with laundry, car troubles, to providing a hot meal for me every night. You were always there for me when I needed help. I truly am thankful for the love and support you have provided me through these many years.

Lastly, I would like to acknowledge and thank my partner, Jasmine Tabuzo. Thank you for the unconditional love and support you have given me throughout my time in the faculty. Thank you for always encouraging me and pushing me to keep moving forward whenever I wanted to quit. Thank you for all the times you spent late at night helping me, providing me with honest feedback and just keeping me company. Thank you for keeping me sane when I felt like I was going insane and for reassuring me whenever I was unsure or lost. You have truly been my inspiration to finish this project and have been the rock that's kept me grounded.

Thank you.

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1.0 INTRODUCTION

1.0 Introduction

As human beings, we love to play. Humans have been playing since the beginning of our existence on Earth. But why do we play? Humans play for many reasons. Whether for physical fitness, religion, passion, to experience new things, or as a source of entertainment. Play is a crucial part of our everyday lives. Play allows human society to evolve and advance. It advances cultures through tradition, technology through experimentation and creativity, and civilization through technology. Since the dawn of human civilization, humans have created tools to help make everyday tasks easier. The wheel was invented to help roll heavy objects, spears and clubs were created to help hunt and catch prey for food, and baskets and bags were created to carry smaller objects on our bodies. By using these tools or playing with them, humans have been able to improve them and evolve them into something better by finding flaws in the tools. Creativity is at the heart of play; creativity moves hand in hand with human evolution. Some of the greatest technological advancements came from human ingenuity and creativity. However, education often focuses more on test scores rather than fostering creativity within students, as described in Mitchel Resnick's book "Lifelong Kindergarten" which will be discussed later in the literature analysis section.

To this end, this practicum will look toward learning resource centers. A learning resource center is described as the following: "a library, usually in an educational institution, that includes and encourages the use of audiovisual aids and other special materials for learning in addition to books, periodicals, and the like." (Collins Dictionary, 2023). Learning resource centers can include library services, computer/technology services, academic support, career development opportunities, and other unique aids and tools to help students grow in their studies (Southern Illinois University Edwardsville, 2023). However, learning resource centers are mostly found within educational institutions such as schools or universities. To make learning resource centers more accessible to the public, they must integrate the programming of a public library. Therefore, this design project will focus on creating a learning resource center while integrating spaces commonly found within the typology of a public library. The UNESCO public library manifesto describes it as "the local centre of information, making all kinds of knowledge and information readily available to its users" (1994). This outlines that the public library must be accessible to all, regardless of gender, age, and ethnicity. This practicum aims to create a learning resource center with the aspects of a public library, where users will still be able to borrow books and the like for on-the-go learning and reading.

This relates to the field of interior design through evolving typologies and how the built environment can change how users interact with the facilities. Suppose a learning resource center is meant to enrich and complement educational institutes with audio-visual aids and technological aids. In that case, combining it with the programme of a public library will make it much more accessible to the general public. Then, by designing the facility using the typology of playgrounds, the environment will effectively support, nurture, and encourage collaboration, interaction, and creative learning. This is discussed in the literature analysis section through Aquillano and Hawkins' book "Design and Play: Imagination Needs Places to Thrive" where they explore how playscapes such as playgrounds help nurture imagination and creativity within youths.

This practicum aims to explore a new learning resource model that simultaneously meets the needs of nurturing creativity and learning and can keep up with the needs of a society flooded with digital technology.

Therefore, introducing characteristics of maker spaces and other interactive experiences, and then integrating them into a learning resource center's design is paramount to the idea of a new (LOC) model. Maker spaces are integral to the maker movement. The maker movement can be defined as a cultural movement for making; it comprises a "community of hobbyists, tinkerers, engineers, hackers and artists who creatively design and build projects for both playful and useful ends." (Martin, 2015). The maker movement values an individual's ability to create and consume. Through making and exploring, the learning resource center can become a place that encourages learning about different topics and fields through hands-on interaction.

Finally, to further the idea of interaction, the learning resource center must be able to attract more visitors daily. When one thinks of third places, an individual tends to think of the place that makes them most comfortable when not at home. This could be a coffee shop, a park, a recreation center, a restaurant, or even the local shopping mall. One thing in common is that these places are places of play and exploration. While the education system is historically rooted in traditional teaching methods, it could likely benefit from adapting, in order to better foster creativity. As stated by Sir Ken Robinson, "The digital revolution has put sophisticated tools within reach of almost everyone. But even the most accessible of them are worthless without the ideas and expertise of those who use them." (Resnick, 2017, p.X). Indeed, users' creativity is most important in the evolution of the new iteration of the next great technological discovery. Thus, this practicum aims to explore the concept and theories behind 'design and play,' a methodology of introducing play into the design and creating interactive environments that attract visitors of all kinds.

1.1 Context and Rationale

1.1.1 Education Meets Play

What exactly is 'play,' and why is it important? Aquillano and Hawkins (2017) describe play as "the freedom of choice, personal enjoyment, and a focus on the activity rather than the outcomes. It can be an individual or social act and is often self-directed, fun, exploratory, creative, challenging, and physical. It is a time when we learn to collaborate, problem-solve, use our imaginations, and develop resilience and empathy" (p.23).

Play is essential in all aspects of our life and health; it can act as a catalyst for improving physical, social, mental, and creative health. Play is also closely related to developing social skills and an individual's mentality and creativity; the more one uses their imagination, the more creative one becomes. In the research of Aquillano and Hawkins (2017), they discovered that the decline in free play has led to an increase in anxiety, suicide, depression, feelings of helplessness, and narcissism in children, youth, and young adults. In their study, they conducted several surveys. They found that individuals were most happy doing activities such as talking with friends, while they were least happy doing activities such as homework; in other words, they disliked activities that are heavily rooted in traditional academic environments. Thus, it can be observed that the decline in learning effectiveness within academic institutes, such as high school classrooms, is consequently increasing preferences for learning in creative environments that promote play.

Aquillano and Hawkins (2017) also found that over the past 25 years, there has been a significant decline in the creativity of young adults, as shown by the results of the Torrance test of creative thinking from the past 25 years.

Some might think the solution to these issues is simple: add play into activities. However, many barriers stop this, such as socioeconomic barriers, timed and scheduled activities, the standardization of safety and concerns, accessibility and location, the decline of recess, and, the biggest obstacle to play, too much screen time. The digital era has made it easier for people to seek instruction and mimic what they see and read online, inhibiting the imagination and limiting the freedom of conducting activities (Aquillano and Hawkins, 2017, p.27). Therefore, introducing the idea of play to a learning resource center can make education seem more fun and attract more end users. This practicum aims to answer play-related questions, such as how design can benefit from play and how play can be used to shape spaces and programmes.

1.1.2 Makers in the Making

The practicum seeks to also research and introduce the typology of makerspaces alongside the typologies of public libraries, learning resource centers, and play spaces. Maker spaces can be defined as spaces for individuals to do just that, make. These spaces are places for learning by doing; engineers, artists of all kinds, creatives, and others can tinker, create, learn, and teach others. Some may ask the question of why maker spaces? What makes them unique? Public library spaces have increasingly been changing to public spaces for gathering rather than reading and borrowing books to learn. Therefore, the maker space acts as both a space and a place for individuals to gather socially and learn in meaningful ways. As stated by Regalla et al. (n.d.), “Libraries have always been community hubs for learning – places to wonder, investigate, discover new ideas, and build knowledge” (p.10). Libraries act to empower people and impart knowledge through reading and educational programs. In this sense, the public library can be seen as a place of consumption, but what if it could also be a place of production? Through maker space programs, the library can create a renewed sense of value that achieves both learning objectives and produces new and useful things for the local communities. In Regalla et al. (n.d) research, they interviewed library staff for their opinions on the idea of maker spaces. They answered that the public library can provide services and programs for free to the community, allowing access to resources that low-income communities may not have (p.10). The public library still holds significance to those who cannot afford or easily access schools and technology to aid their learning.

1.1.3 Learning Resource Center as Third Place

This practicum aims to reinvigorate the learning resource center typology; to this end, it must meet the ability to become what is known as a ‘third place.’ According to Jordan and Degraaf, “Third places are public places where people can gather and interact informally. They are a venue for passive recreation programming” (2019, p.17). The difference between third place and the other two places, first place (home) and second place (school/work), is that third place allows individuals to relax, put aside their worries, and enjoy the company and activities they are partaking in. The learning resource center this practicum seeks to create accomplishes the balance between a third place and a second place, a place for learning that is still fun. Third places “act as the heart of a community’s social vitality and are the foundation of a functioning democracy” (Jordan and Degraaf, 2019, p.17). However, in the modern digital age, the third place for many youths and young adults

has become digital spaces, such as Facebook, Instagram, and Twitter.

1.1.4 The Goal

The research in this practicum aims to understand these topics to their full extent and their possible relations to a learning resource center. To create an evolved learning resource center interior environment model, this research must understand the needs of the digital society, the emerging typology of maker spaces, and the implementation and exploration of the ideas of play.

1.2 Project Goals, Objectives, and Research Questions

As outlined in the previous sections, many issues are found within the current library model in the context of the current era. The objectives of this practicum will focus on creating a new model for the public library or, instead, on how to create engaging and fun spaces that can be used within the public library setting. It should be noted that the core values of the library, as outlined by UNESCO, are to act as “the local centre of information, making all kinds of knowledge and information readily available to its users” and to “provide digital technologies that allow virtual access to information, collections, and programmes” (1994, 2021). Different typologies of the maker movement and ideas of play within design will be explored to build upon the public library’s mission while maintaining its identity. This will be supported by research from educational and academic writings and strategies that create both learning environments and environments that encourage freedom and movement. Using the existing Masonic Memorial Centre in Winnipeg, MB, Canada, and building upon its foundations, the main objective is to transform the building into a learning resource center based on the public library typology with environments that encourage learning through play. The goals and objectives that guided this research included:

- The exploration of the makers/hacker spaces and coworking environments with a focus on enhancing the public library typology.
- To examine the idea of Play theory in learning environments.
- To create a learning resource center model based on design strategies implemented and theorized through research and development.
- To develop design strategies based on the information gained through the literature review.

To further aid in exploring this practicum, research inquiries/questions were created to navigate the research found within the literature review. These inquiries were used in the hopes of finding relations between the different typological built environments and how they may enhance the environments of public libraries and their surrounding communities:

1. What interior design strategies can potentially enhance the current public library typology and support the integration of learning/production spaces?
2. How can interior design be used to make the public library more appealing and attract more end-users?
3. How will the theoretical implementation of different space typologies within a public library model affect the intended users and how they interact with the interior spaces?
4. How can the theory of play be integrated into interior environments meant for learning and enhance the built environment?

1.3 Design Methodology

The methodology for this practicum includes a literature analysis focused on the concepts and theories of the digital society and technologies that can enhance the public library, the typology of maker spaces, and views of play within the work/learning space and the built environment. The knowledge gained from this analysis allows for a better understanding of the needs of the users and the built environment. This is supported by a precedent study that looks at real-world examples that have implemented some or all of the design theories within their own built environments and the range of success of these implementations. The project then analyzes the chosen site to better understand current conditions and limitations the site may impose on the design model. A programme outlines what the built environment must contain based on the chosen users/client and how it will do so. Finally, this document will provide a full in-depth design proposal to implement most of the theories explored in the literature review to meet and satisfy user needs. This design proposal will then be reflected upon to study its effects on the end-users and the community it is situated in. It will also provide feedback on how this model can be improved.



2.0 LITERATURE ANALYSIS

2.0 LITERATURE ANALYSIS

2.1 CREATIVITY AND LEARNING

2.1.1 The Learning Spiral

As a society, we are constantly evolving, creating new things, and developing old ones to keep up with the current technology. The automobile has come a long way, from wagons and carriages to vehicles with engines that can reach speeds we once never thought were possible. These technological advancements are thanks to humans' innovation, creativity, and drive to make things better than the last. Creativity is at the heart of everything we do as an ever-evolving society. Mitchel Resnick, a LEGO Papert Professor of Learning Research at the MIT Media Lab, writes in his book "Lifelong Kindergarten" (2017) about a need for a change in how students learn. In his book, Resnick describes his meeting with the president of Tsinghua, Chen Jining, where Chen claims that the students of the Chinese education system were not prepared to meet the needs of an evolving society (p.2).

Resnick also states that the problem wasn't necessarily visible as most students were doing well and achieving top grades from elementary through high school. These students, as Chen describes them, are 'A Students' (Resnick, 2017, p.2). Chen states that what 'A' students were missing was creativity and innovation (p.2). Chen stated that a new type of student was needed; he referred to these students as 'X Students.'

X students are risk takers who are prepared to explore new ideas and challenge themselves with their own problems. These students typically came up with unique solutions and ideas (Resnick, 2017, p.3). In a society that is constantly changing and innovating, there is a rising trend in the world's need for more X-style thinkers.

Creativity is not something that can be taught. Rather, it is something that can be nurtured. Resnick writes that kindergarten has been the best invention of the previous thousand years and is the best model for cultivating creativity (2017, p.6.). Kindergarten should be an environment where young children can develop their imaginations and learn while playing and exploring alongside their peers. However, the current education system is focused on academics; Resnick describes it as a period of "testing, data collection, competition and punishment." (2017, p.10). This focus on academics and test scores seems to be entering kindergarten classrooms (2017, p.10). However, this is detrimental to the growth of young children ages 4 through 6, as they learn through exploration and play.

So, what makes the kindergarten model for learning so crucial for older years? This can be explained through Resnick's explanation of the creative process or, as he refers to it, "the creative learning spiral" (2017. p.11). As kids play, they are effectively engaging in the creative process; they imagine, create, play, share, reflect, and then start the cycle over (2017. p.11). According to Resnick, as kids go through the creative learning spiral, they are developing as creative thinkers.

The Creative Learning Spiral is as follows:

- **Imagine:** A person imagines what could possibly be created or done.
- **Create:** The person then turns what they imagined into a tangible physical object.
- **Play:** They then begin to test and play with it, looking for any flaws, what could be done better, or even added to it.
- **Share:** They can then ask others to test and collaborate on their creativity. The two begin to share ideas with one another.
- **Reflect:** The group then reflects on the design, how did it fail, what the successes were, and how it can be done better; they can research and look at precedents to make their creation better.
- **Imagine:** Based on the other stages of the creative spiral, the group starts again, imagining new things and improving on them based on their previous experiences in the creative process.

(Resnick, 2017, p.12.)

This process is repeated many times, using different materials, designs, patterns, etc. This is how some current technologies that helped society evolve came about. For example, the carriage turned into an automobile; corded telephones and radio frequencies created the cell phone for instant telecommunication; the internet was created to share information and research rapidly. The question is, how can we change the education system to nurture creative thinking?

2.1.2 The Four P's

Resnick provides a framework for cultivating and developing creative learning. The framework for creative learning, or as Resnick refers to it, "the four P's of creative learning" (2017. P. 16), are as follows:

- **Projects:** Resnick puts an emphasis on project-based learning. By creating and going through projects, the student is able to continually go through the creative learning spiral, developing their own ideas and problems and solving them.
- **Passion:** Passion is important when working on projects. If students are able to work on subjects they enjoy, they will be more willing to work harder and longer on them.
- **Peers:** As explained by Resnick, creativity is a social process. Students collaborate, share and build upon each others' work. People should be able to ask others for help and input on their projects. By working together, people can create better communities that suit the needs of the many.
- **Play:** Using play, Resnick states that "playful experimentation" is the key to "creativity and encouraging young people to take risks and try new things." This allows students to continually create and experiment with new things, objects, and projects and find new ways to interact with others.

(Resnick, 2017, p. 16)

Resnick also outlines a few misconceptions of creativity and the four P's. In total, Resnick lists four misconceptions of creativity. They are the following:

- Creativity is about artistic expression
- Only a small segment of the population is creative
- Creativity comes in a flash of insight
- You can't teach creativity

(Resnick, 2017, p. 18)

These misconceptions lead most adults to undervalue the idea of creativity within the education system. Within the first misconception, creativity does not have to be limited to artists, painters, writers, movie directors, etc. Other professions can also show creativity (Resnick, 2017, p.18.). Resnick gives a few examples: doctors can be creative when diagnosing patients, strategists are creative in creating plans for companies, and entrepreneurs are creative when they come up with new products (2017, p.18). In view of the second misconception, most people think that only a small population of the world is creative, such as people who invent the next big technological advancement or artists such as Michaelangelo or Da Vinci (Resnick, 2017, p.18). These types of creatives are what Resnick refers to as “Big-C Creativity” (2017, p.19). The type of creativity we should be looking for and nurturing within children is what Resnick refers to as “Little-C Creativity” (2017, p.19). Little-C Creativity is used to generate ideas that are useful in everyday life (Resnick, 2017, p.19). These ideas do not have to be unique; they could be ideas that others have thought of before. If the idea you thought of is new and useful to your own everyday life, then that is Little-C creativity and the thinking we need to encourage within the education system (Resnick, 2017, p.19). The third misconception of creativity is that most people believe an idea is born from a sudden idea. However, Resnick argues that only a few ideas and projects are like this. Creativity and the creative process take much longer than a single moment. Resnick states that creative and unique ideas come suddenly, but they usually happen after going through the creative learning spiral many times (2017, p.20).

The final misconception is that you cannot teach creativity. While some may find that the best way to support creativity is to get out of their way, others, like Resnick, believe creativity can be nurtured (2017, p.21). Resnick states that children's creativity must be nurtured, supported, and encouraged (2017, p.21). It is akin to “a farmer or gardener taking care of plants by creating an environment in which the plants will flourish” (Resnick, 2017, p.21). The most important aspect that this practicum must focus on is the idea of creating a playful environment that will nurture and support creativity within everybody in the interior environment

The question is, how do we design an environment that encourages creative thinking? The answer lies within Resnick's framework for creativity, The Four P's.

The first P, Projects, describes how creative thinking must be encouraged and developed through project-based work. Now we can design environments that suit projects of all types. As Resnick states, there are many scholars that promote hands-on learning, in other words, they learn best by doing and participating in activities (Resnick, 2017, p.36). This is the essence and culture of the maker movement. Designing and creating maker spaces within a learning resource center allows students to carry out projects they may not be able to within a traditional classroom.

The second P, Passion, is about supporting various ideas, projects, and subjects. The design should accommodate any project that a person may want to carry out. Resnick writes, that to incorporate technologies that aid in learning and education, the idea of “low floors” and “high Ceilings” is important (Resnick, 2017, p.64). This idea of low floors and high ceilings is that idea that the space should allow beginners to easily be able to get started on their project (low floors) and then be able to work their way up to work on more complicated projects (high ceilings) (Resnick, 2017, p.64).

The third P, Peers, is the idea that projects and ideas should be able to be communicated and shared easily and seamlessly. This is to create the environment of a learning community. The idea of a learning community lets students work on their projects while collaborating with others. As stated before, creativity is a social learning process. Thus, the design of the learning resource center should look toward models of third places and the idea of a social hub. A few examples of social spaces for learning can include stage areas, performance areas, cafes, coffee cars, places to eat, play areas, etc.

The fourth and final P is Play. During creative learning, play is one of the most important steps. This is where students can experiment with their work and have fun. As Resnick describes, there are many paths and styles in which a student can learn or direct their project/work (2017, p. 139). In addition to the idea of “low floors and high ceilings,” Resnick also adds the idea of “wide walls” (2017, p. 139). The idea of a wide wall, as stated by Resnick (2017), allows for many different pathways to exist within a space (p.140). This is because children often have different subjects they want to explore, so there will need to be space for various projects (Resnick, 2017, p.140). People have many different ways in which they learn best. Therefore, designing a space that allows for play and experimentation is the most optimal plan.

2.1.3 Considerations for Project

This section has explored the importance of creativity and play within the education system. Using Resnick's (2017) framework of the Four P's of creativity, we can effectively design an environment that will help encourage creative learning in young children and adults. As described, creativity is the driving factor for evolution and everyday life. It is an important skill which people will need in an ever-evolving society. By utilizing ideas like the low floor, high ceilings and wide walls, we can imagine spaces and typologies that will work within a learning resource center to attract more users and nurture play and creativity through learning.

Table 1: Section 2.1 Resources

Theory/Theorist	Literature/Year	Description	Connection to design
Mitchel Resnick	Lifelong Kindergarten (2017	A book on how to nurture creativity, imagination and play within the education system	Provides a framework with which to apply to the chosen typology and its environments when designing.

Table 2: Section 2.1 Design Applications

Theory	Summary	Potential Design
The Learning Spiral	The idea of how creative learning works. This is a model used in kindergarten learning but can be effective for learning within older years. The learning process requires students to create and share.	• Create large open spaces where students can create projects both big and small, as well as collaborate with other peers.
The Four P's	A framework for creating an environment that encourages creative thinking. Includes theories such as the "low floors and high ceilings as well as wide walls.	• Bright working lights • Varied ceiling heights to accommodate any type of project or learning method. • Areas for both wet and dry application of experimentation • Material that can withstand multiple types of materials being used on it and can be easily cleaned.

2.2 THE PLAYScape, DESIGNING OR FREEDOM AND FLEXIBILITY

2.2.1 Why Play?

As individuals, we each have a place or activity that allows us to relax and forget about our worries, a place where we can focus on enjoying an activity or the company of others. These activities can range from a simple get-together with friends to sports-related physical activities or even playing video games from the comfort of our homes. Play is inherent in all these activities. But what exactly is play? As mentioned in a previous section, Aquillano and Hawkins describe ‘play’ as follows: “Play involves freedom of choice, personal enjoyment, and a focus on the activity rather than its outcomes. It can be an individual or social act and is often self-directed, fun, exploratory, creative, challenging, and physical. It is a time when we learn to collaborate, problem solve, use our imaginations, and develop resilience and empathy.” (p.23, 2010). From the moment humans are born, we begin to play and seek new stimulants to gain knowledge and test our physical limitations. These activities can happen In many different places. As kids, we often go to the park to play at the playground or a nearby field to enjoy a friendly game of soccer, football, or baseball. As adults, we visit restaurants and cafes to enjoy the company of others; we go to bars to dance and have fun; we go to the gym to release stress and improve our physicality. Play offers many benefits; it improves physical, social, mental, and creative health (Aquillano and Hawkins, p.25, 2010). Of these four benefits, this practicum will specifically look at the three benefits of social, mental, and creative play.

Play has been shown scientifically to improve an individual's social health and skills. Hawkins and Aquillano’s research outlines how children can learn to be flexible, accommodate others around them, make compromises, and work through conflicts. The act of play allows one to interact with another in cooperation (p.24, 2010). It is important to note that an individual can benefit from different types of play. For example, dramatic play allows a child to learn and understand the importance of social roles.

In contrast, social play allows one to consider the needs of others and to learn and appreciate different values and perspectives. Through play, a child learns the essential skills of compromise and adaptation within changing environments (Aquillano and Hawkins, p.24, 2010). The act of play is essential to improving both the emotional and social well-being of an individual.

The next benefit of play outlined by Aquillano and Hawkins is the benefits to mental health. There is shown to be a correlation between the decline of the act of free play and mental illness. These mental illnesses can include anxiety, suicide, depression, feelings of helplessness, and even narcissism in youth, children, and even young adults (Aquillano and Hawkins, p.24, 2010). However, play can help counteract the effects of these illnesses; it has been shown that play allows children to gain the self-control and esteem they need to build meaningful relationships with others and understand their environments and the world they live in. As stated by Aquillano and Hawkins, while playing, children learn important problem solving skills, they learn to socialize and follow instruction, and they learn how to emotionally express themselves, which are important skills related to mental health (p.24, 2010).

The final and arguably the most crucial benefit to play is the benefit to an individual's creative health. Through research, play and creativity are closely linked together. Children are able to better express their creativity, critically think and achieve better grades in school when using their imagination while playing. (Aquillano and Hawkins, p.25, 2010). In their writings, Aquillano and Hawkins provide the research of Kyung Hee Kim, who had analyzed close to 300,000 creativity test scores over the past 25 years and found that there has been a steep decline in creative thinking. As expressed by Kim, children have become "less emotionally expressive, less energetic, less talkative, and verbally expressive, less humorous, less imaginative, less unconventional, less lively and passionate, less perceptive... and less likely to see things from a different angle" (Aquillano and Hawkins, p.25, 2010). In schools, there is typically a focus on mathematics, sciences, history, and English literacy; these classes tend to emphasize formulas and rules, not creativity. Studies such as music, art, dance, and theatre are not as focused on in primary schools. These activities could be a passion for some youths, and as kids, we love to play and explore our passions. However, as we grow older, we aren't given as many opportunities to explore these paths. These learning paths are seen as extracurricular activities that can be done if one isn't busy with homework from the more "essential courses" like math, physics, biology, history, etc. Only recently have a few select schools allowed their students to conduct self-studies and explore the things that interest them as individuals. If one can explore and express their talents, one can become more creative, dynamic, and flexible and learn more.

If play and exploration have all these benefits, why hasn't this idea been employed more often and regularly? There are many barriers to play, as described by Aquillano and Hawkins. A few of the significant obstacles to play include but are not limited to the following:

- Socioeconomic Obstacles: low-income urban families may not have the same access to activities as others. For example, fewer after-school activities, a lack of space to play, more economic stress, and fewer resources for children to play with. (Aquillano and Hawkins, pg.26, 2010)
- Time and scheduled activities: more individuals may choose to do more structured and time-constrained activities as they may not have the time to explore free play. (Aquillano and Hawkins, pg.26, 2010)
- Safety Standards and Concerns: Safety requirements, social fears and anxieties inhibit and label play as unsafe for children unless an adult supervises it (Aquillano and Hawkins, pg.26, 2010).
- Accessibility and Location: some areas and communities do not have access to space for children to play, such as publicly accessible open fields and playgrounds. To add to this, even if there is a playground, it may not be accessible to all, such as those with physical disabilities. (Aquillano and Hawkins, pg.26, 2010).
- The decline of recess: studies have shown a steady decrease in schools that allow for recess time, and when most students enter high school, there is no recess. (Aquillano and Hawkins, pg.26, 2010).

- Too much screen time: the most significant factor limiting free play and freedom is how much time an individual spends on digital devices daily. There is the saying to "get out and play" for a reason, as young adults and youths these days spend most of their time looking at their mobile phones and watching television. This is detrimental to one's creativity as most tend to mimic what they see online and on television, limiting their creative expressions and imagination as they become limited in how they think. (Aquillano and Hawkins, pg.26, 2010)

2.2.2 Design as a Playscape

Play can be seen as a notion and an activity inherent in everything we do. So how exactly can play be incorporated into design? Play can be incorporated by how we shape things, for example we can define where play can take place, and how it can take place. To design using play is to create spaces that are inherently free in form, test the imagination, and allow one to explore the built environment without a set of predetermined destinations. Kate Tooke, a landscape architect, tackled this issue by designing a playground. Within the design, she included four different types of play (Tooke, p.140, 2010):

- Functional: physical activities such as running, jumping, and climbing engages a child in taking on risks and challenges.
- Constructive: creative activities like shaping, building, and making. These activities allow a child to experiment and discover.
- Dramatic: these activities take on an imaginary role through role-playing and involve acting and storytelling.
- Games: more organized activities, like tag or hide and seek, allow a child to experience competition and teamwork.

Different spaces or environments were designed and proposed for the playground through these types of play. These ranged from slides, bridges, water play areas, log steps, drums, musical toys, fun mirrors, and climbing walls. (Kate Tooke, p.137, 2010). This example is a good representation of how play can be incorporated into spaces, and how the built environment can be designed, allowing a space to be dynamic, flexible, and responsive.

2.2.3 Designing for Play

The built environment can be used as a catalyst to encourage play, but how exactly can spaces be designed for play? As Shackell et al. describe, “Successful play spaces are located and designed for reference to their surroundings. Play equipment and features are chosen for the way they can complement and enhance their setting as well as for their play value” (p.27, 2008). In other words, the design is responsive to the context it is put in. The space does not enforce play but encourages and supports it. A ‘playable’ space can also be described as a shared space that meets the needs of various people (Shackell et al., p.64, 2008). The playability of a space is not just determined by its physical characteristics but also by the social and cultural aspects that are created through the space. Play has many features and factors to consider. An excellent playable space must be open and welcoming; it supports all types of play without limiting its user. It can also have both informal and formal features that encourage play

2.2.4 Considerations for Project

This section has explored the importance of play and how it can be incorporated into design. While most spaces for play are designed as outdoor activity spaces, the challenge is how an indoor space can be designed to encourage play and break the social norm of quiet and rigid interiors. Play has many benefits for the design of a library as it promotes self-exploration and learning. Just as play allows children to grow and develop skills, the built environment can also benefit from play. The designed space should promote physical play by exploring experimental forms and shapes to encourage risk and be imaginative. The learning resource center can be seen as a second place, an auxiliary environment where one can learn. However, by integrating play into the interior environments, we can turn the spaces into third places and attract more users. Turning a learning resource center into a third place for individuals will help it gain more visitors and enhance its community by encouraging learning through playful environments.

Table 3: Section 2.2 Resources

Theory/Theorist	Literature/Year	Description	Connection to design
Sam Aquillano and Amanda Hawkins	Design and Play: Imagination Needs Places to Thrive (2017)	A book on the aspects of play; explains the history, barriers and pros and cons of play.	Used to outline and describe the theories of play
Kate Tooke	Design and Play: Imagination Needs Places to Thrive (2017)	A book on the aspects of play; explains the history, barriers and pros and cons of play.	Used to examine how play can be incorporated into the design and the different typologies of play
Aileen Shackell, Nicola Butler, Phil Doyle, David Ball	Design for Play: A Guide to creating successful play spaces (2008)	A guide on creating and maintaining affordable play spaces for kids.	Used to study how to design for play and maintain its spaces. Emphasizes the value of play within the design
Debra J. Jordan Donald G. DeGraaf	Programming for Parks, Recreation, and Leisure Services (2019)	A textbook on how to create programs for parks, leisure, and communities	Used to describe the third place and how to create a program to design the environment.

Table 4: Section 2.2 Design Applications

Theory	Summary	Potential Design
Designing a Playscape	The theory or idea of how to design a playscape. Design for different types of play such as functional play, constructive play, dramatic play, and games.	• Include areas for multiple types of play. The area should be wide and long to allow for multiple activities. • Include reflective surfaces, climbable features, built in environmental features.
Designing For Play	The theory of how play can exist within a space. It does not necessarily need to force people to play physically, but can invoke ideas of play.	• Include shared spaces, can include social spaces. Every space should be accessible and useable by all ages and users. • Create spaces that can both be formal and informal i.e. stage areas, open studios, open and closed workshops. Private and public spaces

2.3 MAKING FOR THE FUTURE

2.3.1 *The Maker Movement*

While sections 2.1 and 2.2 focused on Play as a design challenge and idea, this section will focus on the typology of the maker space as a medium in which play can be incorporated to enhance the public-library typology. As defined by the dictionary, a maker space is “a communal public workshop in which makers can work on small personal projects.” (Meriam Webster, 2022). As Regalla et al. describes, making is the process of quite simply making; the definition of making depends on the person, as making can mean something different to them (n.d, p.8). Anyone can be a maker, such as artists, dancers, tech-savvy individuals, engineers, chefs, woodworkers, and many more.

How would the public library benefit from maker spaces? As Regalla et al. state, libraries provide opportunities for the community to learn and connect. In these spaces, people can investigate new ideas and build upon their knowledge through books or cultural and educational programs (n.d, p.10). The library has always been a place that encourages, improves, and teaches written and spoken literacy of individuals and the community. However, in the modern age, the public library has become a place of commons, a place of gathering and collaboration. As learned in the first topic of this literature review, for the library to evolve, it must become a place/space that focuses on the prosumer and not just the consumer. The learning resource center must become a place that produces and consumes simultaneously. The maker space typology is the perfect catalyst that can realize that idea. It is both a space for learning and creating. These spaces can intrinsically also be playful as they promote exploration, freedom, and collaboration through engagement. Using the library as the medium through which a makerspace can exist breaks down one of the barriers to play, socioeconomic differences. As a library staff member quoted in Regalla et al.’s toolkit, “the library welcomes everyone and offers programs/services free of charge.” (n.d, p.10). Locating within a public library, the services and access to these spaces become accessible to virtually anyone with no limitations and free of charge; therefore, those from low-income families can enjoy these programs.

2.3.2 *Defining the Maker*

What exactly defines a maker space? In simple terms, any place can become a makerspace if there is a way an individual can create things within that space. Any room can become a maker space, whether in your basement, classroom, field, or backyard. If there are people, materials and resources, and the mindset to make, then anywhere can become a makerspace. What defines the activity depends on the individual programme and tools and resources available at the time. Regalla et al. wrote that the types of spaces can significantly vary. A maker space can be a multi-use space, such as a coworking area; it can be a dedicated space, such as a wood shop, it can be a pop-up community event in a field, or it can be something that can be taken home if given the proper tools, and it can also take place virtually (n.d, p.11.). The maker space promotes interactivity and learning. In “everyone is a maker: makerspace master plan” written by Gyroscope Inc. they note that the makerspace must “provide expanded technology and other resources to the community” (2017, p.15). This is to expand the community interest and plan the future of the library. To expand on this, the makerspace is now incorporating new digital technologies such as 3d printers and laser cutters, which are generally not accessible to the public for free.

The makerspace provides unique opportunities for individuals of all ages and ethnicities while also providing community engagement through shared interests. Most importantly, these spaces can be flexible and accommodate many activities; it does not need to be stagnant; these spaces grow with the learning resource center.

As the Gyroscope Inc team (2017) iterates, the process of programming a maker space and developing its cyclical. It begins with defining goals and outcomes, gaining an audience/interest, finding the resources, and then prototyping and implementing the programmes. Then through feedback and evaluation, the process is repeated. The makerspace is constantly improving as the community grows and evolves.

2.3.3 *Planning for the Makerspace*

The Gyroscope Inc team even provides architectural guidelines for Makerspaces. As they describe, the makerspace can include both non-dedicated and dedicated plans. A well-designed learning environment is best to promote and support general learning behaviours. These spaces should consist of natural light, good ventilation, and good acoustics and provide opportunities for collaboration and teamwork. The Gyroscope Inc team states, “The Makerspace should be designed to support creative collaboration and experimentation across multiple disciplines and media... It is important to not over design in order to allow flexibility and freedom for the use of the space to evolve”. (p.59, 2017) . In this sense, designing a makerspace is entirely open-ended and challenging. At the same time, one must consider adjacencies for potential new makerspaces and programs. The makerspace must inherently be integrated into the public library design; the makerspace must not be seen as separate from other parts of the library but must connect to them and enhance them. The relationship between the makerspace and the library must be symbiotic in nature. The makerspace enhances the public library experience, while the resources of the library aid in creating new programmes.

A few space planning concepts for Makerspaces include but are not limited to:

- The HOMAGO concept
- The Clean, Wet, Dusty concept

The first concept, as explained by Gyroscope Inc., is the HOMAGO concept, which stands for Hang Out, Mess Around, and Geek Out. It is a plan that goes beyond the confines of the classroom and allows for the use of specialized equipment while also encouraging socialization and community growth. The term HOMAGO was created by researchers who studied how “youth learn through social and recreational use of media” (p.60, 2017). This space plan allowed for furnishings and equipment to be rearranged into different zones and created a support system for activities of engagement that range from passive/casual to rigorous/focused.

- The Hang Out (HO) refers to lounging, thinking, and brainstorming spaces.
- Mess Around (MA) refers to the tools, materials, and resources used to freely create and make new projects.
- Geek Out (GO) refers to more focused workshops that utilize complex tools and requires safety supervision.

Potential Spaces

	The Hang Out	Mess Around	Geek Out
Lounge	✓		✓
Workshops		✓	✓
Design Hub	✓		✓
Open Studio	✓	✓	✓
Stage	✓		
Coffee Bar	✓		
Restaurant/café	✓		
Library	✓		✓
Multiuse room	✓	✓	✓
Computer lab	✓		✓

The second space planning concept is the Clean, Wet, Dusty Concept. This concept utilizes rather large spaces and divides them into different areas and disciplines through a spectrum ranging from Clean, Wet, and Dusty while remaining connected to a central creative hub (p.61. 2017). If space is limited, then the floor plan and furnishings should remain flexible, allowing for quick changes and resets within the larger context of the library. Some areas within this plan include laboratories, art centers, textiles, electronics, and wood shops (Wet, Clean, Dusty). At the same time, the central hub acts as an area for resources, to display work, and as a central meeting area for participants.

2.3.4 Local Example of a Makerspace

A local example of a makerspace is the North Forge Fabrication lab located at 125 Adelaide Street, Winnipeg, Manitoba, Canada. North Forge Technology Exchange is a non-profit startup incubator and accelerator (North Forge Technology Exchange, 2022). They work with startups to help them from the beginning stages of ideation through to production. At North Forge they provide their members with mentors, coaches, and various programs to help an individual grow their startup.

They currently have the largest non-profit- fabrication lab within North America (North Forge Technology Exchange, 2022). The FabLab also houses a Makers Market, a place where members can also sell the products that they create within the FabLab. With the Makers Market, North Forge can allow innovators to seamlessly move from ideation, to prototyping, to fabrication and manufacturing, to the selling of local goods. The North Forge FabLab a wide range of equipment that can make almost any idea come to life. Their equipment and spaces range from woodworking, metalworking, 3D printing, laser engraving and cutting, to electrical engineering (North Forge Technology Exchange, 2022).



Figure 1: North Forge Woodshop (North Forge Technology Exchange, 2022a).



Figure 2: 3D Printing Room (North Forge Technology Exchange, 2022b).

The idea behind North Forge and its FabLab can aid in the design of the Learning Resource Center. By incorporating a large area with equipment and spaces that can aid in ideation and creation of projects then the space can become more flexible and allow its users to become producers rather than just consumers.

North Forge also has experienced makers that can help users that are less adept at using complicated machinery and equipment to make their products and creations. In this way they are able to force users to interact and collaborate with each other. This is a good example of how a space and its strategic planning model can encourage collaboration between peers. This will help to enhance the local community that the makerspace is located in and encourage others to explore their passions and ideas without any obstacles

A tour the North Forge FabLab facility revealed what equipment was used in each space, and what types of spaces should be included in a makerspace/ Fabrication Lab. This will help the design of the Learning Resource Center as it will include the use of Makerspaces.



Figure 3: Princess Auto Tool Room (North Forge Technology Exchange, 2022c).

2.3.5 Considerations

A few design considerations for creating a makerspace should be flexible, dynamic, and transformative while retaining a connection to its surrounding host, the public library. Implementing the HOMAGO and Clean, Wet, Dusty space concepts outlined by the Gyroscope Inc. team will be helpful for programming these spaces. While the maker space should be designed to be playful and fun, it must remain a space for learning and collaboration at its core.

Table 5: Section 2.3 Resources

Theory/Theorist	Literature/Year	Description	Connection to design
Lisa Regalla, Pamela Van Halsema. Regallium Consulting LLC, MLIS, P Van Halsema Consulting	Makers in the Library: A toolkit for building a community-driven makerspace. (n.d.)	A toolkit on how makerspaces can improve libraries. Defines the maker movement, and outlines the pros and cons of maker spaces	Used to define the framework needed to design an effective makerspace.
Gyroscope Inc	Everyone is a Maker: Makerspace Master Plan (2017)	A guide and toolkit for programming makerspaces	Outlines a few planning concepts used in designing the maker space

Table 6: Section 2.3 Design Applications

Theory	Summary	Potential Design
HOMAGO and Wet, clean, dusty	Theory describes different planning strategies and design strategies for makerspaces.	• Provide flexible furniture arrangements to create multiple spaces within a single large space. • Ample storage areas for many different types of materials and projects. • Resilient material choices to prevent excessive damage • Provide multiple large spaces for different types of workshops

2.4 INTERACTIVE ENVIRONMENTS

2.4.1 Design and Interactivity

This section intends to define and understand the idea of interactive design within architecture and design disciplines. The concept of interactive architecture will be explored as a process within architectural design. The idea will be explored within the context of rapidly evolving technologies and the concept of ‘play.’ Much like how people interact with outdoor environments such as sports fields, playgrounds, water parks, etc., this section aims to find how to make indoor environments more interactive. People are forced to engage with the environment in the previously mentioned places. Activities such as swimming pools, rock climbing, and other areas force the user to engage with the environment to participate in the activity. However, a library does not have a programme that causes users to interact with its settings and spaces. Most people only interact with a library’s interior environment when looking for a book or using a space to read, study, or learn. This section aims to study interactive spaces and technologies and how people interact with them and utilize them within the interior environment to create a more dynamic and fluid public library model.

2.4.2 Interactive Technology

The idea of interaction and design is a concept that has existed throughout history. Architecture, as defined by Ruairi Glynn, is “the melting pot of the arts and sciences” (Glynn, 2016, as cited in Fox, 2016, p.7). Glynn, states that the innovation of sensory and responsive technologies leads to the discovery of new ways to make connections across different fields. These connections can be seen in just a few examples provided by Glynn, such as robotics and performing arts, biology and visual arts, wearable computing and perceptual sciences, and digital fabrication and Artificial intelligence (Glynn, 2016, as cited in Fox, 2016, p.7). Technology is becoming increasingly intertwined and invasive in our everyday lives, within the broad context of the advancement of technology that promises to create and advance objects such as microchips, autonomous cars, flying machines, phones, and computers. Technology has permeated almost every built object in some way or form. The idea is to consider how these technologies can be used and become part of the design tool kit to create aesthetic environments, spaces, and forms that become inherently responsive and dynamic. While technology seeks to make life easier through automation, the built environment can also become autonomous. As Glynn writes, “architecture imbued with autonomy” challenges designers, architects, and engineers, to go beyond the basic design disciplines and look to understand and define the effects of technology within emotional, perceptual, and social lenses (Glynn, 2016, as cited in Fox, 2016, p.7.)



Figure 4: Muscle Facades (Oosterhuis and Bioria, 2008a).



Figure 5: A Bamboostic Forest (Oosterhuis and Bioria, 2008b).

As stated by Oosterhuis and Bioria, modernist architecture is based on an outdated aesthetic that leaned on the idea of mass production (2008 p.70). Every building looked the same, whether residential houses, theatres, libraries, recreational centers, etc. Every building could easily be navigated because they had similar floor plans and programmes. Oosterhuis and Bioria (2008) even note that in deconstructivist architecture, architects start from mass-produced components and attempt to change them in ways that individualize them. However, ONL, an architectural firm in the Netherlands, teamed up with the Hyperbody Research Group in the Netherlands to create a new aesthetic. This aesthetic is based on the idea of customization. They believe that through mass customization of built environments all building components will become unique. Through this idea, the building becomes one giant 3D puzzle (Oosterhuis and Bioria, p.72, 2010). They refer to this architecture as “Pro-active Architecture” (ProA) and is “based on customization that respects the individuality of each component, building up a completely new aesthetic” (Oosterhuis and Bioria, p.72, 2008). In the ProA theory, “buildings are organic, ever-changing vehicles for processing and displaying information. They exhibit independent real-time behaviors, like adjustments in shape in response to changing environmental circumstances such as wind direction.” (Oosterhuis and Bioria, p.72, 2008). The Hyperbody Research Group created interactive prototypes to study the design of ProA buildings. The first prototypes of the Hyperbody group were the “muscle projects” a series of projects aimed to be responsive to their environments. These projects were made to “emphasize the real-time actuated spatial response that a building or architectural space may provide” (Oosterhuis and Bioria, p.73, 2008). Oosterhuis and Bioria note that through the study of their prototypes, they have realized that there is significance in creating interaction through the “organic reshaping of buildings as computers, and as computer displays (Oosterhuis and Bioria, p.78, 2008). They realized that by creating buildings as ‘flexible networked information processors’, the building can become a catalyst for sending and receiving information to and from each other (Oosterhuis and Bioria, p.78, 2008). By incorporating the ideas behind the Hyperbody ProA prototypes, environments can become interactive and flexible. The environments can respond to human interaction which can provoke human curiosity and promote exploration and imagination through technology. This example can be applied to the design of the learning resource center by creating installations within the environment, such as seating, or the walls themselves to move and interact with its visitors.

2.4.3 Interactive Architecture

As defined by Nora Schueler, in their paper, “Interactive Architecture: Extending the Kansei Engineering Approach to Real-time Interactive Spatial Systems”, Interactive Architecture is “An approach to satisfy the increasingly complex demands of architectural performance. It does not only enable a building to adapt to its surrounding, but to engage itself actively in a dialogue with the user” (Schueler, p.4, 2010). For a building to interact with its user, the designer must create the behavior of the building. To do this a designer can implement sensor technology within buildings for the continuous collection of information on how humans interact with their environments. This data can then be interpreted to understand the demands of its users allowing for the design of adaptive configurations of building components, which defines the behavior of the building. (Schueler, p.4, 2010). In interactive architecture, Schueler notes “the building remains programmable, thus adjustable and is able to interact in real-time according to changing demands” (Schueler, p.4, 2010). In Schueler’s paper, they discuss the possibility of using interactive design strategies as a possible method to fulfill current architectural demands. Schueler specifically focuses on the demand of user emotion in the context of performance-driven adaptability.

The study is presented through student design projects that are focused on evoking emotions. In one case study presented in Schueler’s paper (2010), the students designed a parasite building that could attach itself to any office building. The goal of the project was to fight the lack of break opportunities syndrome in workplaces. To spaces presented workers with different extremes of activities ranging from sleeping to wall climbing. (Schueler, p.12, 2010). To keep the spaces exciting and engaging the building contained three spaces that were flexible and could change the space, experience and sensations within the space. According to Schueler (2010), what makes the study interesting is that the project reacts to the user behavior on both the appraisal level of emotion by changing the space causing a psychological response, and on the action level of emotion by forcing the user to directly interact with the environment, (Schueler, p.13, 2010).

2.4.4 Design Considerations

When considering the design of the public library, by designing and incorporating interactive environments, the building can become more engaging and inviting to individual users. The library can become a catalyst of information through the content and its physical body. By incorporating the ideas behind the muscle projects to create sensorial and responsive spaces within the library, a user can have a new and different experience with every visit. Schueler’s ideas on provoking human emotions to create interaction will also prove useful in the design of a public building that caters to a larger audience. A few interior applications that could be applied to the project could include things such as responsive walls, that light up when you touch them, or furniture that is moveable so the users can define how a space can be used, rather than the building being pre curated.

Table 7: Section 2.4 Resources

Theory/Theorist	Literature/Year	Description	Connection to design
Michael Fox	Interactive Architecture: Adaptive World (2016)	A book describing interactive architecture and the role it plays in a digital society. It describes how the infrastructure that is used within the built environment can process information and make observations in order to create more integrated spaces.	The book gives many precedents and design examples of how architecture and design can be interactive through design and installations. Can help in designing a system of how the design functions and can improve itself through future design and iteration.
Kas Oostherius, Nimish Bioria	Interactions with Proactive Architectural Spaces: The muscle projects (2008)	An article, on a few projects, called the muscle projects. Outlines how they work and how people interact with them.	Examples can be used to inform how to design and create custom built-in functions that allows users to interact with the interior space more
Nora Schueler	Interactive Architecture: Extending the Kansei Engineering Approach to Real-time Interactive Spatial Systems. (2010)	A paper that presents interactive design strategies as a way to work with architectural demands. Focuses on student driven projects that are based on evoking human emotions as users interact with the built environment.	Used to create a design strategy around the ideas of interactive design and architecture that evoke user emotions that will help stimulate learning and creativity

Table 8: Section 2.4 Design Applications

Theory	Summary	Potential Design
Customization	The idea of customization is to create iterations or unique objects tailored to a specific space. By doing this the space can become more interactive through the individuality of each component creating the larger space.	Instead of simply using mass produced furniture, create custom built-in objects that will encourage interaction and play. For example, custom seating elements, or custom unique shelves, moveable objects, etc

2.5 UNDERSTANDING THE DIGITAL ERA: WHAT THIS MEANS FOR THE PUBLIC LIBRARY

2.5.1 Fast-Paced Information and Consumption

As humans, we consume information at a high-speed rate. From the moment an individual is born, they are consuming information, learning, processing, and storing it. Through the consumption of information, an individual can learn many things; it teaches us essential skills like how to talk, read, write, walk, run, etc. Depending on the type of information, it can teach us specific skills, different languages, how to cook, different cultures, and much more.

Data is all around us in many different shapes and forms. Over the centuries, access to these different types of information has become much easier. Before technological advancements in the digital era, people had to travel to consume information and learn. An individual was forced to attend school in person, go to work, go to a library to read a book or travel to experience different cultures. Now through the advancements in technology and the widespread ease of access to the internet, a person can experience all of these with the simple press of a button on their smart mobile devices.

Through telecommuting, people can work remotely from the comfort of their homes and attend school lectures without having to commute to school. Individuals can talk to and meet new people through digital platforms such as Facebook Messenger, Tinder, Skype, and other programs. Online tutorials can teach people how to create, fix, and build things with found items at home. Platforms such as Instagram, Twitter, and YouTube allow people to see and experience what other cultures offer without travelling.

Huib Haye Van Der Werf from the Netherlands Architecture Institute stated, “We live in an age in which knowledge and communication are profuse. More important perhaps are the blurred boundaries between the producers and consumers of information within this development” (2010). It has become emergent that the age of books and writing has become outdated and even obsolete; as the digital era ever evolves, it continuously blurs the lines between production and consumption, as stated by Van der Werf. In this sense, Van der Werf also says that the public library plays a critical role in this evolution of things (p.11, 2010).

Van der Werf states that the public library is “not only a symbolic institution that conserves and distributes information, it is also an extension of the public realm itself” (p.11, 2010). Here, Van der Werf is saying the public library must be responsive and dynamic, as its physical presence in the form of public space has become debatable; at the same time, its immaterial reality has become questionable, as the public library can either evolve or stagnate and become obsolete (p.11, 2010). In this sense, Van der Werf is correct; as stated in previous sections, the public library is becoming out-dated; digital devices allow a person to rent, buy or borrow a book all on a single slim portable device; they no longer need to visit the library to be able to learn and consume. The library’s public spaces are also becoming superseded as common spaces. Places such as boutique coffee shops and activity centers serve as meeting places for individuals and their friends.

To put the evolution of the public library into context, Van der Werf traces the history of the place back to the 17th century when the library’s popularity began to rise. At this time, the public library became popular for the same reason: increased accessibility to information. Books had become cheaper to produce, and due to the nationalist and renaissance thinking during this era, buildings known as ‘houses of knowledge’ became popular (Van der Werfe, p.11. 2010).

These ‘houses of knowledge’ were not just limited to cities, as many of the upper class also built places to house their collection of books. However, even in the 17th century, it was mainly the wealthy and elite that were allowed to read books and, if you had or were part of academic, social status. As Van der Werfe writes, it was not until the 19th century that books became even more accessible to the public as libraries were built using the city’s tax money; this meant that the books truly belonged to the community that housed the library.

In the 20th century, the library was seen as an institution rather than just a building that housed books. The library was viewed as “a paradoxical structure in which an immense plurality of books bound by a concrete form unify and tame diversity...this is the essential foundation upon which modern-day libraries are still being realized” (Van der Werfe, p.12, 2010). In summation, the library has undergone extensible change and evolution over the past century, from being a place of neo-classicist places of power to industrially built equalitarian houses of knowledge to the present-day open houses of cultural diversity (Van der Werfe, p.12, 2010).

As seen through the history outlined by Van der Werfe, the library has undergone numerous changes to become what it is today. It was popular due to the ease of accessibility it bought for information. However, in the digital era, the library model has become dated and must go through another evolution to stay relevant. As of now, public libraries are still implemented into city plans. However, it is less for cultural sentiment and more or less used as an economical marketing tool for the city.

2.5.2 The Augmented Community: Changing the Urbanscape to be Dynamic and Responsive

As the last section outlined, humans are creatures of production and consumption at high-speed rates. The library must also be able to respond to this consumption of information to stay relevant. Pang, et al. react to this by arguing for the preservation of the library, or what they refer to as the ‘knowledge commons’ (Pang et al, in Aurigi and De Cindio, 2008, p.187). As Pang et al. write, there has been an argument on the importance of producing and protecting what is known as the space of commons. The term ‘commons’ can be defined as “a space of ‘common’ property, produced by communities of people” (Pang et al, in Aurigi and De Cindio, 2008, p.187). As learned in the previous section, the library was seen as a community space created through the taxes collected within the community. Therefore, the public library can be seen as a space of commons, specifically the ‘knowledge commons.’ This idea then stems from the knowledge commons, a place that contains free resources for all peoples in the hopes of building relationships, producing new knowledge, and creating a cultural democracy. Pang refers to Benkler (2003) in defining the knowledge commons as “institutional spaces, in which we can practice a particular type of freedom-freedom from the constraints we normally accept as necessary preconditions to functional markets.” (Pang et al, in Aurigi and De Cindio, 2008, p.187).

In other words, it is a space in which one can freely explore the topics they wish to without the constraints of work or school. It can be said that the community is the centerpiece around which all other spaces, resources, and instruments evolve. Here Pang et al. have established that “the community is continuously being shaped by the very things it is shaping” (Pang et al, in Aurigi and De Cindio, 2008, p.188). Since modern communities continuously grow through the technologies they produce and consume, it can be said that the public library must also be shaped by these same technologies to stay relevant and evolve with the community. Thus, the idea of the knowledge commons allows individuals to become co-producers and participants within their respective communities instead of being simple consumers of information.

2.5.3 Digital meets Analogue

With an understanding that libraries must now meet the needs of digital users and trends to evolve, the question of how this can be achieved is asked. In a day and age where one can order, buy and borrow a book on their digital devices, the book’s physical form has become less popular than their digital counterparts. However, some archival works cannot be digitalized and thus remain only in physical form. However, as learned in other sections, the public library is a house of knowledge used to preserve and distribute diverse cultures and information through physical books. Rients Dijkstra and Jason Hilgefort explore this concept of how the library can be changed to help the book survive and thus make the library relevant in the digital era. As stated by Dijkstra and Hilgefort, “the library of the future is not a building. It is a concept- one that allows for the transformation of existing libraries as well as the design of new libraries of a completely different nature”. (Dijkstra and Hilgefort in Van der Werf, p.67, 2010). They outline this concept as an idea that is a tool to help the physical book survive in the onslaught of new media. Dijkstra and Hilgefort suggest that the book can survive as the “dominant medium for the storage of knowledge, art and fiction” (Dijkstra and Hilgefort in Van der Werf , p.67, 2010). They state, “by giving books a new meaning, they will form a vivid background to the growing offerings of digital media” (Dijkstra and Hilgefort in Van der Werf, p.67, 2010). How exactly can this be done? Dijkstra and Hilgefort provide an example of freeing the book from the shelf and its organization system.

The library of the future is a concept that allows one to discover, build, write, and create all at once. Just as the digital era blurs the line between production and consumption, what if digital technologies can be used to blur the lines between digital media and physical books? The technology of RFID tagging allows a book to be freed from the library’s Dewey decimal system of organization (Dijkstra and Hilgefort in Van der Werf, p.68, 2010). RFID tagging enables the book to sit anywhere within the library; it becomes flexible and can speak with other books. When an individual searches a topic using the internet, the internet packages every bit of information on that topic for the user to browse at their whim. It even shows the user topics related to the initial issue or other cases they may be interested in. In the library Dewey decimal organization system, a book is stuck in its category and place; it doesn’t show the user anything other than itself. However, with RFID tagging, the book can now act like the internet and sit with other related things; the user can now see other topics related to the book they were looking for. This is just one idea; Dijkstra and Hilgefort outline a library model where there is no distinction between books and digital media; it is a library that focuses on both the digital and physical realm; it is dynamic, free, flexible, and focuses on the many-to-many, it embraces technology and co-production, and is about the prosumer and the idea of custom (Dijkstra and Hilgefort in Van der Werf, p.71, 2010).

As an example, by using RFID tagging for the location of books, the book is free from the bookshelf, the book can exist almost anywhere within the building. This could create design opportunities for custom furniture that can house books in unconventional places, such as the restaurant, the exhibition area, or other places. This also means that the library does not necessarily need to be designed as a traditional library with rows upon rows of bookshelves. The library can now utilize unique ways of storing books.

2.5.4 Takeaway - Design Implications

This topic explored the current library model and how it has evolved over the centuries. It outlines arguments for the importance of the public library typology within the modern digital era. However, it also describes the limitations of the current library model and how this must be updated for the library to remain relevant in the modern digital era. The final section of this topic suggests how the public library typology can begin to integrate digital technologies to blend and blur the lines between digital and physical. Ultimately, the biggest takeaway from this topic is that the library must move from the traditional model to a future one. This includes but isn’t limited to the following changes for design considerations.

- From physical to digital
- From static to dynamic
- From pre-organized to self-organized
- From order to disorder
- From fixed to flexible
- From the one-to-many to the many-to-many
- From prefabricated to self-produced
- From separated technology to embraced and integrated technology
- From simple consumer to prosumer
- From standardization to customization

Table 9: Section 2.5 Resources

Theory/Theorist	Literature/Year	Description	Connection to design
Huib Haye Van Der Werf	The Architecture of Knowledge (2010)	A book containing project precedents and usurps from other theorists in the library. Articles focus on the library typology and how it came to be through history, and how it can change in the future.	Van der Werf's article within this book, focused on giving context to the public library typology and its importance within today's society. Analysis can be used to see how the public library has evolved through history and how design can once again aid in changing the typology.
Rients Dijkstra, Jason Hilgefort	The Architecture of Knowledge (2010)	A book containing project precedents and usurps from other theorists in the library. Articles focus on the library typology and how it came to be through history, and how it can change in the future.	This article in Van der Werf's book discusses how the library typology can change and evolve with technology. It gives an example of how the library can become more dynamic rather than static through the implementation of designs and spaces. For example the use of digital technology to aid in information gathering and wayfinding.
Natalie Pang, Tom Denison, Kirsty Williamson, Graeme Johanson and Dan Schauder in Alessandro Aurigi and Fiorella De Cindio	Augmented Urban Spaces: Articulating the Physical and Electronic City (2008).	A book containing the works of other researchers in the field of architecture and digital technologies.	Articles is used to discuss the typology of the knowledge commons and how the library can evolve into that of a third place. This can be seen through the idea of combining makerspaces to create a space that produces within the library rather than just having spaces where users only consume information

Table 10: Section 2.5 Design Applications

Theory	Summary	Potential Design
Utilization of modern-day technologies	One of the ideas presented within this topic was the use of RFID tagging instead of the Dewey decimal system. This allows the book to be free from the bookshelf.	• Custom furniture pieces that can house books in place of a standard bookshelf. • Custom bookshelves that can be flexible and move or be moved.
Static to dynamic Pre-organized to self-organized Fixed to flexible Etc.	These are design ideas that were derived from the idea of integrating modern day planning techniques and technologies. The building could self sustain by creating its own new furniture or partition designs utilizing the workshops it houses.	• Varied lighting systems and solutions • Flexible furniture • Modular furniture • Moveable partitions

2.6 Summary of Chapters and Conclusions

Sections 2.1 and 2.2 Creativity, Learning, and the Playscape. These sections explore the importance of creativity in learning and how it can be applied to design to create the playscape. They include theories and ideas from authors and researchers such as Resnick, Aquillano, Hawkins, Tooke, Shackell, Jordan and Degraaf. Section 2.1 gives context to the practicum topic as a whole. It stresses the importance of how current education systems need to change to nurture creativity. This includes theories of creating the learning spiral mixed with the framework of the four P's. To further this idea of nurturing creativity in education, section 2.2 focuses on the idea of play. By adding play to design through the theory and ideas of the playscape and third places, the design of an educational institute can accommodate creative learning.

Section 2.3, Making for the Future, examines the makerspace typology. As section 2.1 outlines the importance of project-based learning, creating makerspaces within the design will benefit the overall goal. This section includes the thoughts and research of Regalla et al., and the Gyroscpe Inc. team on how to create and maintain a makerspace. This section describes a few space planning concepts when designing a maker space. These concepts are included within the HOMAGO idea and framework.

Section 2.4 Interactive Environments is the section that explores the idea of interactive environments. For a building to become a playscape, the visitor must be able to interact with it as they would a play structure. This section includes the ideas and theories of Fox, Oostherius, Bioria, and Schueler. They argue for design incorporating interactive environments to create more engaging and inviting buildings for individual users. This section also explores some ideas of past projects, such as the muscle projects, which look at how buildings can receive and give out information based on their environment. It explores the idea of reactive installments to make engaging and interactive environments.

Section 2.5 Understanding the digital era considers the library typology's history and role in a modern digital society. It discusses how the library can evolve with technology to become something new. This section includes the ideas of Van der Werf, Dijkstra, Hilgefort, and Pang et al. While Van der Werf discusses how the library's typology came to be through the past, Dijkstra and Hilgefort offer how the library can change with new technologies and look towards the future. This section argues for using digital technologies and a programme that creates a more dynamic interior environment rather than a static one. This section considers the visitors' experience within the building.

In conclusion, this literature review has brought into context and argued for changing the current library system to adapt and nurture creativity within children and young adults. It can be argued that creativity cannot be taught but can be nurtured. Current educational institutes, however, cannot do this. Thus, by looking at learning resource centers that provide the tools necessary for project-based learning, individuals can express their creative freedom through their projects. By designing a learning resource center based on the public library model, it can be accessed by the general public more easily. The literature review also examines the idea of play to encourage creative learning and freedom further. Thus the inclusion of playscape typologies such as playgrounds has been explored to create interior environments that allow for collaboration, exploration, and accommodation for almost any subject or project.

The maker space typology is also reviewed to enhance and expand upon the learning resource center's tools and spaces. Finally, the literature review examined the idea of including new digital technologies to create more engaging and interactive interior environments inviting visitors. With the knowledge provided through the literature analysis, the interior spaces of the project can be designed in a way that encourages visitors to learn through creativity and play, while allowing spaces to be collaborative, and supportive in any way the user might need. The theories of makerspaces and HOMAGO will be used to create spaces that allow for both wet, dry, and dusty projects and learning methods to take place. While the Four Ps provide a framework to design those spaces to be more friendly for collaboration, and play, i.e. high ceilings, low floors, and wide walls. The literature that describes the use of technologies for interaction will be utilized to create unique design opportunities within the building that forces visitors to interact with their environments more.

Table 11: Design Strategies Derived from Literature Review

Topic	Design Objective	Design Strategies
Creativity and Play	To encourage creative thinking, collaboration, and learning through playful environments.	• Utilize Low floor, high ceiling, and wide wall theory to accommodate a wide range of learning subjects. • Create playful environments, akin to playgrounds within the interior that encourages movement and collaboration. • Use the four P's as a programming and space planning framework. • Breakdown areas into play areas, eating, relaxation, quiet learning, etc
Maker Movement	To encourage project based learning alongside traditional learning methods.	• Utilize the HOMAGO and Wet, clean, dusty frameworks in designing makerspaces. • Spaces should accommodate for wet spaces, dusty spaces, and clean spaces. • Spaces might include woodshops, audiovisual rooms, printshops, electrical areas, etc. • Provide the necessary technology, tools and machinery needed for each makerspace.
Interactive Environments	To create environments where a person can interact with the building	• Utilize modular furniture as well as built-in furniture. • Create wide open space so people are able to move around freely. • Create installations and facades or interior partitions capable of changing the environment based on what the user needs at the moment.
Digital Society	To include technology in a way that allows a user to explore the environment, and allows the building to grow and evolve	• Provide new and updated technologies such as fab labs and touch screens. • Create and design automated environments that are intuitive and do not require the aid of a staff. • Technology can be used in a way to make the space more dynamic, for example the RFID idea by Dijkstra and Hilgefort.



3.0 PRECEDENT STUDIES

3.0 Precedent Studies

3.1 Calgary Central Library

Location: Calgary, CA
Completion Date: 2018
Design Architect: Snøhetta
Prime Consultant Architect: DIALOG
Client: Calgary Municipal Land Corporation (CMLC)
Total Square Meters: 22,300m²/ 240,000 ft².



Figure 6: Calgary Central Library (Snøhetta, 2018a).

The Calgary Central Library as seen in figure 6, is located between downtown Calgary and East Village. The Calgary Central Library is one of North America's most active and largest library systems, with more than half of the population being active users (Snøhetta, n.d). The Calgary Library was created as the new main branch within the city and was designed accordingly, inspired by and created for the inhabitants of Calgary (Snøhetta, n.d). A light rail transit line crosses the site from above to below ground on a semi-circular curved path, dividing the two neighbourhoods (Snøhetta, n.d). As a design strategy in response to the existing site, the main entry is lifted above and captures the train line (Snøhetta, n.d). The building can be approached in every direction, as the design has terraced slopes that rise up to the heart of the building (Snøhetta, n.d). The library's entry plaza can act as both a portal and bridge between the two neighbourhoods and create visual and pedestrian connections throughout the site (Snøhetta, n.d). The library itself is quite successful, with over 670,000 local users, while at the same time acting as a place of connection for the diversity in its residents (Snøhetta, n.d). The library was created in an effort to create a cultural campus alongside, Studio Bell, Glenbow Museum and the Arts Commons within the heart of Calgary (Snøhetta, n.d).

Programme Analysis

The Calgary Central Library contains many spaces that are traditional, non-traditional, and unique in regard to the program of the building. The library's programme is organized in the order of 'fun' to 'serious.', as the more public and energetic activities on the lower floors and then subtly transitioning to quieter activities such as studying on the upper floors (Snøhetta, n.d). Figure 7 shows this phenomenon with transition from play areas to the upper floor library space. On the street level, multiple multi-purpose rooms around the library's perimeter increase the connection between the interior and exterior (Snøhetta, n.d). The building contains four floors with many spaces outfitted for "digital, analog, group and individual interactions" (Snøhetta, n.d).

The ground floor houses the children's library, which offers playhouses that allow for crafts and drawing based activities (Snøhetta, 2018) as seen in figure 8. Early literacy programs and spaces are also equipped for a full-body indoor play experience (Snøhetta, 2018). The library's top floor contains a great reading room, designed as a jewel box. The great reading room provides space for focused study and innovation (Snøhetta, n.d).



Figure 7: Calgary Central Library Interior Stairs (Snøhetta, 2018b).



Figure 8: Calgary Central Library Play Area (Snøhetta, 2018c).

The Northern point of the library houses the Living Room. The Living Room is a unique space within the library, looking over the train line and the entry plaza (Snøhetta, n.d). By overlooking the entry plaza, it can serve as an invitation for those outside to enter and as a view to look from the library's interior onto the exterior and its impact on the city (Snøhetta, 2018). Certainly, the Calgary Central Library is a great achievement as an architectural project, as it stays true to a traditional library in utilizing traditional programming, while at the same time introducing contemporary programs in a step towards moving the library to become a social hub rather than a quiet retreat.

Building Qualities

The Calgary Central Library is an architectural marvel in design and aesthetics. Upon approaching the library, one is greeted by the crystalline geometry of the facade. The innovative facade comprises triple-glazed panels with a modular hexagonal pattern (Snøhetta, n.d). The expansive glazing around the building expresses the library's goal to showcase spaces that invite all visitors to enter (Snøhetta, n.d). Differing variations of the pattern on the curved facade are created using alternating panels of fritted glass and iridescent aluminum (Snøhetta, n.d). Parts of the facade are made to resemble an open book, snowflake-like patterns or interlocking houses to push the ideas of the community and collective as a whole (Snøhetta, n.d). The visual design language is continued in the interior through the way-finding and signage within the building, expressing the inclusivity of the building (Snøhetta, 2018).



Figure 9: Calgary Central Library Atrium (Snøhetta, 2018d).

Within the interior of the building, when entering the great reading room, visitors must enter through a transitional space with softened lights and acoustics (Snøhetta, n.d). The room comprises vertical wood slats that line the space, which aims to create privacy and visibility (Snøhetta, n.d). This technique and use of materials are able to define an interior space without using full solid walls (Snøhetta, n.d). The building has an expansive wood archway created from western red cedar, which frames the entrance and continues into the main lobby, atrium, and up towards the oculus, which sits over 85 feet high (Snøhetta, 2018). Figure 9 showcases the buildings atrium view into the different spaces on varying floors. The perimeter of the atrium is lined by wood slats and is shaped like a pointed ellipse (Snøhetta, 2018). The shape is used to help reinforce the orientation of the building, allowing for the quick recognition of the organization and circulation of the library (Snøhetta, n.d). Natural light floods the atrium through the wood slats and creates sight lines between the atrium and the western facade of the building (Snøhetta, 2018). The raw materials used in this project are selected as a design strategy to reinforce the idea of the library being a place of engagement rather than a receptacle for books (Snøhetta, 2018).

Analysis

The use and arrangement of the different spaces within the library allow for various types of engagements as one moves from the lower floors to the upper floors. This includes full social interaction, small study groups, solo reading, and private group meetings within some multipurpose rooms. Figures 10 and 12 showcase drawings of the buildings floor plans and section which better showcase the spaces and how they transition between each room. Engagement and interaction is the central goal of the Calgary Central Library, and it has succeeded, as seen through many active users from the local community. The atrium and arrangement of activities on each level are successful, both programmatically and aesthetically, as it allows for ease of use and way-finding within the building. The large oculus at the top of the atrium allows natural light to flood the space, providing warmth and illuminating travel paths. Design elements and less successful strategies can be found within the Northern Living Room as seen in figure 11, as the designers intended to have seating arranged in group settings to promote interaction. However, users still divided and arranged seating for solo reading, leaving the rest unused, forcing other visitors to populate other library areas.

After analyzing this project, the following design strategies have been considered for the practicum project:

- Create circulation that is an intentional aesthetic element.
- Utilize large amounts of glazing where possible to allow the largest amount of daylight to flood the interior.
- Utilize materials in a way that divides rooms, without creating a feeling of enclosure.
- Organize space that separates study and play activities while achieving soft transitions between spaces.
- Allow material to seamlessly pass from the exterior to the interior to emphasize the connection between indoor and outdoor interaction.

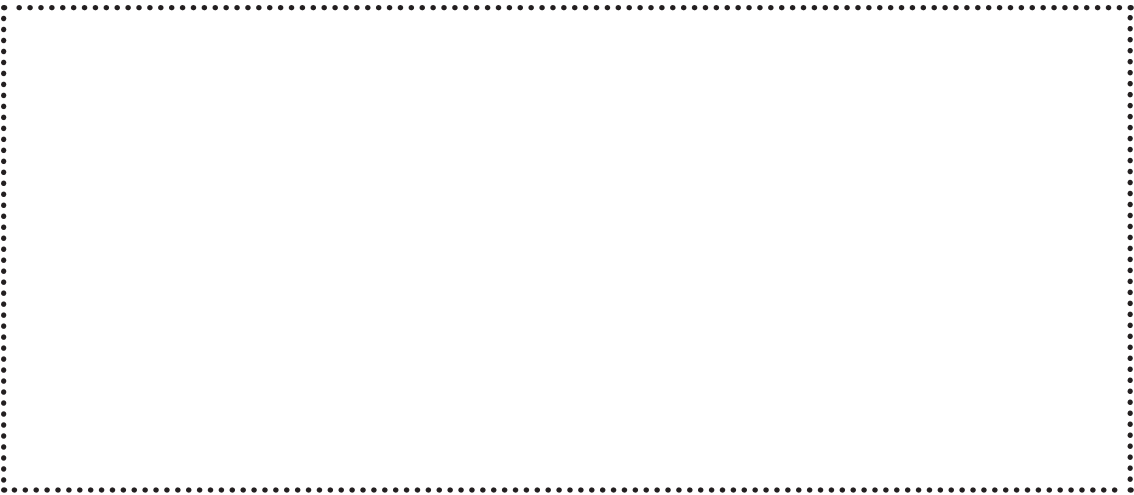


Figure 10: Calgary Central Library Section Drawing (Snøhetta, 2018e).



Figure 11: Calgary Central Library Meeting Area (Snøhetta, 2018f).



Figure 12: Calgary Central Library Level 4 Floor Plans (Snøhetta, 2018g).

3.2 Helsinki Central Library Oodi

Location: Helsinki, Finland
Completion Date: 2018
Design Architect: ALA Architects
Client: City of Helsinki
Total Square Meters: 17,000m²



Figure 13: Helsinki Central Library Oodi (Tuomas Uusheimo, 2023a).

The Helsinki Central Library Oodi (Oodi Central Library) figure 13, is situated on an important site. It front faces the Finnish parliament, the Eduskuntatalo, and other major institutions surrounding Kansalaistori Square (ALA Architects, 2018). The project is a reminder of the Finnish library act's mandate for libraries to promote lifelong learning, democracy, active citizenship, and freedom of expression (ALA Architects, 2018).

The spatial concept of the Oodi Central Library is made of three floors. It is designed as an inhabited, asymmetrical steel bridge supported by two large steel arches. (ALA Architects, 2018). With its main function as a library, books only fill one-third of the space the entire space (ALA Architects, 2018). The space reduced on-site storage by design, and the architects could insert additional cultural facilities and functions (ALA Architects, 2018). This decision was made as an experiment within Finnish libraries to offer services other than only lending books (ALA Architects, 2018).

Programme Analysis

The design of the library is divided into three distinct levels. The ground floor acts as a non-commercial interior public space by extending the town square into the interior, while the third floor is where the library resides and is aptly named "Book Heaven." (ALA Architects, 2018). The second floor is enclosed with rooms for additional services and facilities (ALA Architects, 2018). The National Audiovisual Institutes movie theatre, Kino Regina, is also on the ground floor alongside a café (ALA Architects, 2018). The middle floor, also named the 'attic,' comprises flexible rooms: multi-purpose rooms designed and equipped for loud and quiet activities, Makers' spaces, and audiovisual recording studios (ALA Architects, 2018).

The top floor, also known as 'book heaven,' (figure 14) is where the traditional library functions can be found with rows upon rows of book stacks. Here, the best qualities of a modernist traditional library and 21st-century technology are combined (ALA Architects, 2018). The space creates a serene atmosphere and invites visitors to learn, read, innovate, and relax (ALA Architects, 2018). The third floor also contains a 360-degree panoramic view of the city and an outdoor terrace that overlooks Kansalaistori Square (ALA Architects, 2018).



Figure 14: Oodi Library Space (Tuomas Uusheimo, 2023b).



Figure 15: Oodi Childrens Reading Room (Tuomas Uusheimo, 2023c).

Building Qualities

The Oodi Central Library was built using only local materials in an effort to combat local climate conditions (ALA Architects, 2018). The facade of the building is covered in 33mm. thick Finnish spruce planks and is configured in a sweeping curve that extends the library outwards (ALA Architects, 2018). This strategy creates a canopy above the city square, which mixes the interior and exterior spaces and provides shelter for outdoor events (ALA Architects, 2018).

Interior views utilize dynamic geometry unique to each space for ease of way-finding and differentiation of spaces. The core spaces utilize natural tones of materials and accentuate them with neutral colours, while auxiliary spaces use bold dark colours to create contrast between the functions within the library.

Analysis

The Helsinki Central Library Oodi has a design created from the site's context and the program's goals. The main concept lies within the interaction of the three levels.

The overall project is successful in almost every aspect. It has successfully introduced other services not traditionally found within the typology of a library and has taken it in a new direction. The core activities are located on the ground floor and third floor. The ground floor is a bold, busy, frequently updated space for quick visits and walkthroughs. In contrast, the third floor is a calm and meditative area above the bustling city square

The project is successful both in interior and exterior design strategies and is able to achieve a near-zero energy building through its unique facade. The spaces succeed in creating large open spaces for various activities, allowing visitors of all ages to find something to do within the library. As seen in figures 15 and 16, while being a part of the same building, the two spaces couldn't be more different. The reading room showcases soft seating and vibrant colours to catch the attention and accommodate for younger visitors, while the middle floor utilises dynamic shapes and hard landscape seating that is more open and accessible for those passing through or meeting with a friend.

After analyzing the Oodi Central Library, the following design strategies have been considered:

- The use of passive energy strategies to reduce the number of mechanical systems needed.
- The reduction of on-site storage to create more space for other functions.
- Inclusion of spaces and functions to target users of all ages.
- The promotion of the interaction between different functions to promote movement throughout the building.
- Engaging design language and geometry to make the project a unique landmark.



Figure 16: Oodi Middle Floor (Tuomas Uusheimo, 2023d).

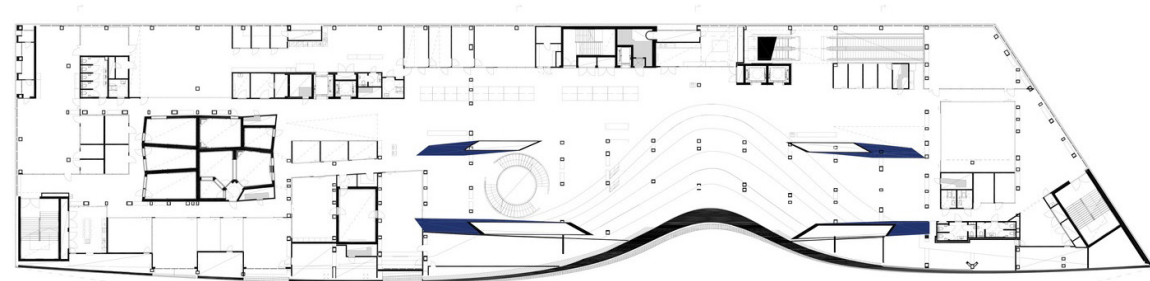


Figure 17: Oodi Floor Plan (ALA Architects, 2018).

3.3 Fuji Kindergarten

Location: Tokyo, Japan

Completion Date: 2007

Design Architect: Tezuka Architects

Total Square Meters: 1,304.1m²



Figure 18: Fuji Kindergarten (Tezuka Architects, 2007a).

The Fuji Kindergarten (figure 18), Designed by Tezuka Architects, is in Tokyo, Japan. It is a kindergarten building designed to be shaped like an oval (Tezuka Architects, n.d). The total perimeter of the building measures 183 meters and is designed for a total of 500 children (Tezuka Architects, n.d). According to the architects, the building is designed to be “a single village” (Tezuka Architects, n.d). The interior of the building is made of integrated spaces that are only separated through the use of furniture (Tezuka Architects, n.d). The building is also designed around three preserved zelkova trees which protrude out of the top of the building. This design won the Moriama RAIC International Prize in 2017.

Programme Analysis

The school is designed around the Montessori learning method, where children can freely explore and roam around the classroom to learn through discovery (Block, 2017). The architect, Takaharu Tezuka, wanted to create the building without physical boundaries. The building is designed as a continuous space that allows unobstructed play and learning (Block, 2017). As stated by Tezuka, “Because the building is a ring, they are looking at each other. There is no sense of a middle. The children learn to be fair to everybody, they learn how to be a part of a nice group.” (Block, 2017). The oval ring building only consists of the covered ground level and the uncovered open second level as seen in figure 19. The roof area acts as a playground for children to run around, while the protruding zelkova trees have nets installed around them, allowing them to climb and play on them (Block, 2017). The roof area only measures 2.1m above the ground, which creates a close connection with the ground level. This allows the children to go between the levels easily (Block, 2017). The upper roof area is surrounded by handrails for safety to stop children from falling. The rails are designed to be close enough that children will not get stuck in them but allow them to dangle their legs through and observe the inner courtyard (Block, 2017). According to Tezuka, “Standard classroom design is unnatural and counterproductive to a positive learning environment.” (Block, 2017). The ‘free plan’ design nurtures “independence and collaboration, without forcing children to sit still and silent for long periods of time” (Block, 2017). The building was designed around the kindergarten programme, a place for children to learn through discovery and play, without any physical boundaries.



Figure 19: Fuji Kindergarten, roof
(Tezuka Architects, 2007b).



Figure 20: Fuji Kindergarten, Inside and Outside
(Tezuka Architects, 2007c).

Building Qualities

The classrooms are left completely open without any delineating partitions or walls, the sound of the children playing and learning is akin to white noise in natural environments (Block, 2017). Figure 20 showcases the transition from indoor to outdoor. The building also has skylights built into the roof deck, allowing natural light to permeate the classrooms below and allow children to peek through from above to below (Block, 2017). The kindergarten is not equipped with any 'play equipment'; in its place, the architecture acts as a playground. "Children are allowed to move about freely, fall down and get wet within a safe environment" (Block, 2017).



Figure 21: Fuji Kindergarten, Classrooms (Tezuka Architects, 2007d).

Analysis

The Fuji Kindergarten, designed by Tezuka Architects, is designed through its intended programme. The kindergarten school is based on the Montessori Method of learning. Thus, the building needed to be open, and allow children to move and discover freely. Thus, Tezuka created a building without physical walls, installing only soft partitioning through furniture. Figure 19 shows the modular, flexible, and moveable furniture used to create groupings of tables and to separate spaces without the use of walls. By creating a ring-like structure, the intended users are able to run endlessly around the building. Figure 23 shows the site plan of the ring like structure in relation to its surroundings. The building successfully encourages learning through the idea of play, collaboration, discovery, and sharing.

After analyzing the Fuji Kindergarten, the following design strategies have been considered for the design project:

- Limit physical boundaries to create a seamless flow between the spaces within the building.
- Utilize and look for environmental opportunities to be brought into the design.
- Allow for free play and exploration within a safe environment.
- Create daylighting opportunities and free views of activities to allow for collaborative opportunities.



Figure 22: Fuji Kindergarten, Courtyard (Tezuka Architects, 2007e).

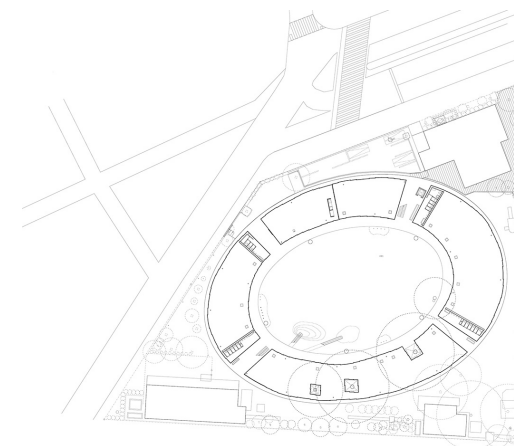


Figure 23: Fuji Kindergarten Site and Floor Plan
(Tezuka Architects, 2007f).

Table 12: Summary of Design Strategies Chart

Precedent	Design Strategy	Spatial Qualities
- Calgary Central Library - Oodi Central Library	Use of colour and building geometry to assist in way-finding.	Use contrasting colors and tones and unique geometry to indicate and define spaces.
Oodi Central Library	Use of passive energy strategies to reduce the amount of mechanical systems needed.	Use local materials and create custom systems to incorporate passive energy systems to the exterior design.
- Calgary Central Library - Oodi Central Library	Inclusion of spaces and functions to target users of all ages.	Include spaces for children and ensure all spaces are easily accessible.
- Calgary Central Library - Oodi Central Library	Utilize design elements to introduce rhythm in the space and direct a visitors pace through the building.	Create design elements that invite a visitor into the building.
- Calgary Central Library - Oodi Central Library	Organize space that separates study and play activities while achieving soft transitions between space.	- Create transition spaces that are seamless. - Incorporate a program that organizes space in order of activities from social to quiet.
Calgary Central Library	Allow material to seamlessly pass from the exterior to the interior to emphasize the connection between indoor and outdoor interaction	Create furniture that is integrated with the building form and elements
- Calgary Central Library - Oodi Central Library - Fuji Kindergarten	Utilize large amounts of glazing where possible to allow the largest amount of daylight to flood the interior.	Provide natural light that penetrates deep into the building.
- Calgary Central Library - Oodi Central Library	Create areas that are quiet and isolated. Introduce new, contemporary programming to guarantee the LRC stays up to date with current trends.	- Provide private areas for solo reading or studying. - Create large multi-purpose spaces that are adaptable to changing trends.

Precedent	Design Strategy	Spatial Qualities
Fuji Kindergarten	Limit use of physical boundaries in play areas. Allow for freedom of movement and exploration	- Use soft seating and modular furniture that can be used as soft partitioning if needed. - Spaces should be able to transform.
Fuji Kindergarten	Create views of other spaces to allow for collaboration	Open spaces as well as use of glazing to create both private and shared moments.



4.0

SITE AND BUILDING ANALYSIS

4.0 Site and Building Analysis

This chapter focuses on analyzing the existing site conditions and the as-built building that is to be designed. In this chapter, the site's selection criteria will be explained to give context to the chosen site. The site's history, surrounding context, and inventory will be explored to find site opportunities and constraints to enhance the community the building is situated in. The analysis will also look at the surrounding demographics to explore the needs of the community and how this building will impact the neighbourhood. This chapter will also study the existing building and its floor plan and design to find any building opportunities and constraints in regard to the design study.

4.1 Site Selection Criteria

420 Corydon Avenue, The Masonic Memorial Centre was chosen as a new Interactive Learning Resource Center site for the following reasons:

1. The location is situated close to Winnipeg's city center. Therefore, it is centralized and accessible to most of the Winnipeg population.
2. As a learning resource center, it should be easily accessible by students and researchers. The site is located thirteen (13) minutes away from the University of Manitoba, nineteen (19) minutes away from the Red River College Notre Dame Campus, and eight (8) minutes from the University of Winnipeg downtown campus.
3. The site should be easily accessible to the public. Six bus stops surround 420 Corydon Avenue. One of which is the express transitway bus line which neighbours the site.
4. The site should have ample amenities to support the design and inclusion of a learning resource centre. The site is located in Winnipeg's Osborne Village and Corydon Avenue, which are filled with local eateries, restaurants, cafes, and more.
5. The site is situated near the Red River. By designing a tall building, it can provide quality views of the river and city life.

4.2 Site History

420 Corydon Avenue is home to the Masonic Memorial Centre. It is located on the South-East corner of Corydon Avenue and Osborne Street, Winnipeg, Manitoba, Canada. This area is referred to as Confusion/Crazy Corner by most locals. (Masonic Memorial Centre, n.d) The Masonic Memorial Centre is the home for "the Grand Lodge of Manitoba, several Masonic Lodges and other Masonic Family Bodies." (Masonic Memorial Centre, n.d). The Centre can rent parts of its facilities to host events outside the Masonic events. The building was built to replace a different Masonic Hall at 335 Donal Street in Winnipeg (Winnipeg Architecture Foundation, n.d). The Masonic Memorial Group opened the building in 1970 during the Masonic group's 95th annual provincial communication (Winnipeg Architecture Foundation, n.d). The Masonic Memorial Centre is a building rich with history and significance to the groups it hosts. The building has been well-kept and maintained, boasting many original features and materials. The Masonic Memorial Centre has remained the host of the Grand Lodge of Manitoba for over fifty-four (54) years since 1969 (Winnipeg Architecture Foundation, n.d) and has stood the battle of time and weathering.

4.3 Site Analysis

4.3.1 Location



Figure 24: Site Location Diagram NTS

The Masonic Memorial Centre, located at 420 Corydon Avenue, inhabits the South-East plot of "confusion corner" in Winnipeg Manitoba. It is directly accessible via Osborne Street and Corydon Avenue. It is also situated close to Pembina Highway, a direct route to the south end of Winnipeg.

4.3.2 Site Inventory



Figure 25: Site Inventory Diagram NTS

LEGEND

- Food and Beverage
- Medical
- Fitness
- Retail
- 400m Radius Walking Distance
- 600m Radius Walking Distance

The building is located in the heart of Osborne Village and Corydon Avenue. Amenities are abundant in this area, surrounded by restaurants, fast food establishments, medical clinics, fitness gyms, and retail stores. Most of these establishments are located within 400-600 metre walking distance. Redesigning the existing Masonic Memorial Centre as a learning resource center will help enhance the local communities.

4.3.3 Neighbourhoods

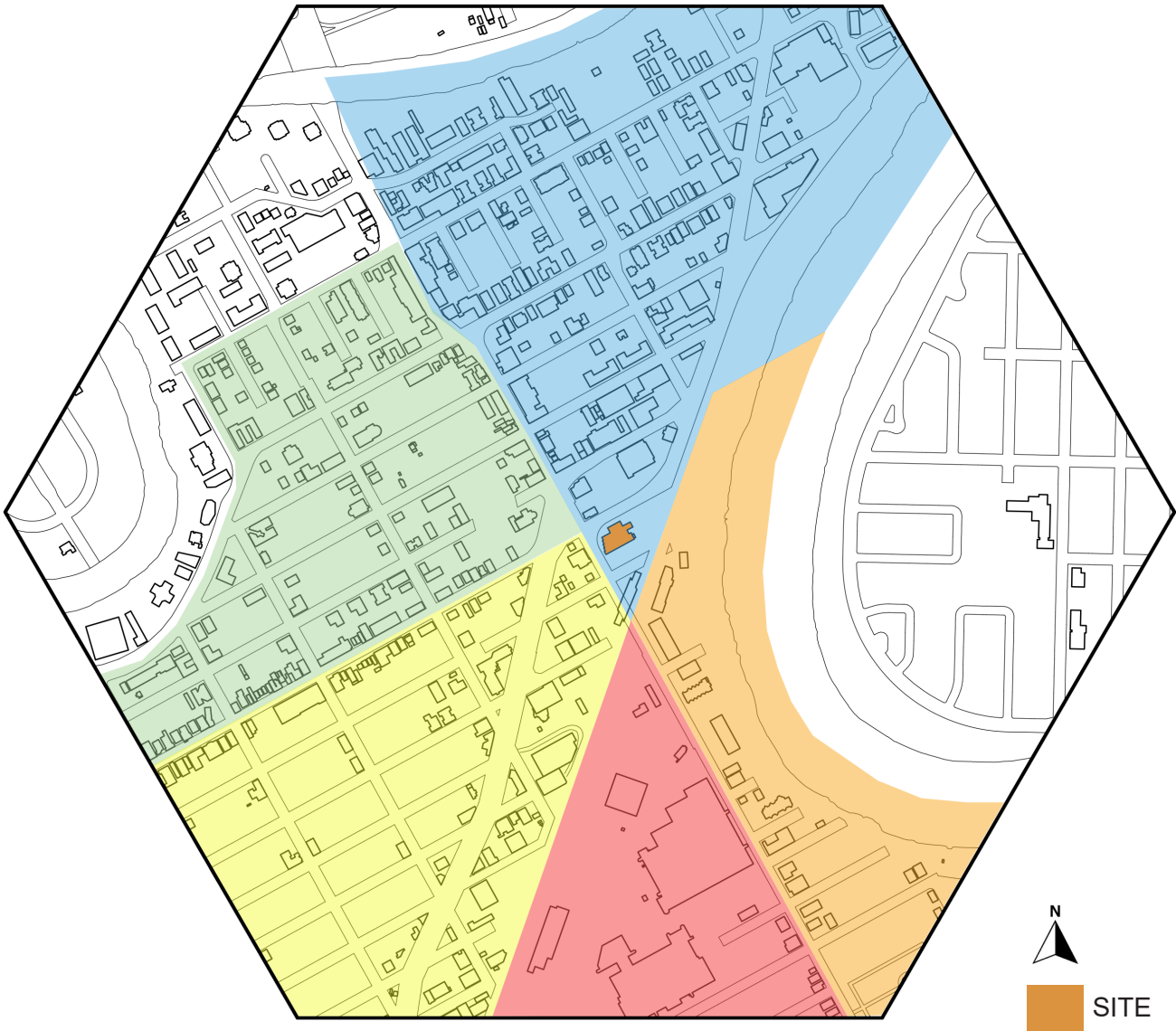


Figure 26: Site Neighbourhoods Diagram NTS

LEGEND

- River-Osborne
- Earl Grey
- Mcmillan
- Lord Roberts
- Riverview

The site is located on the South end of the River-Osborne neighbourhood. This location allows the building to border four other surrounding neighbourhoods of, Mcmillan, Earl Grey, Lord Roberts, and Riverview.

4.3.4 Site Accessibility



Figure 27: Major Pathways Diagram NTS

- LEGEND
- | | |
|--------------------|--------------------------|
| High Traffic Roads | Bus Stops |
| Secondary Roads | Paid Public Parking Lots |
| Express Bus Way | |

The site is located in a very accessible location. It is surrounded by four main roads and many secondary routes. The site is also situated close to the Osborne station, an express bus way, in addition to many other regular bus stops. There are also a few public paid parking lots within a 10-minute walking distance.

4.3.5 Sun Path

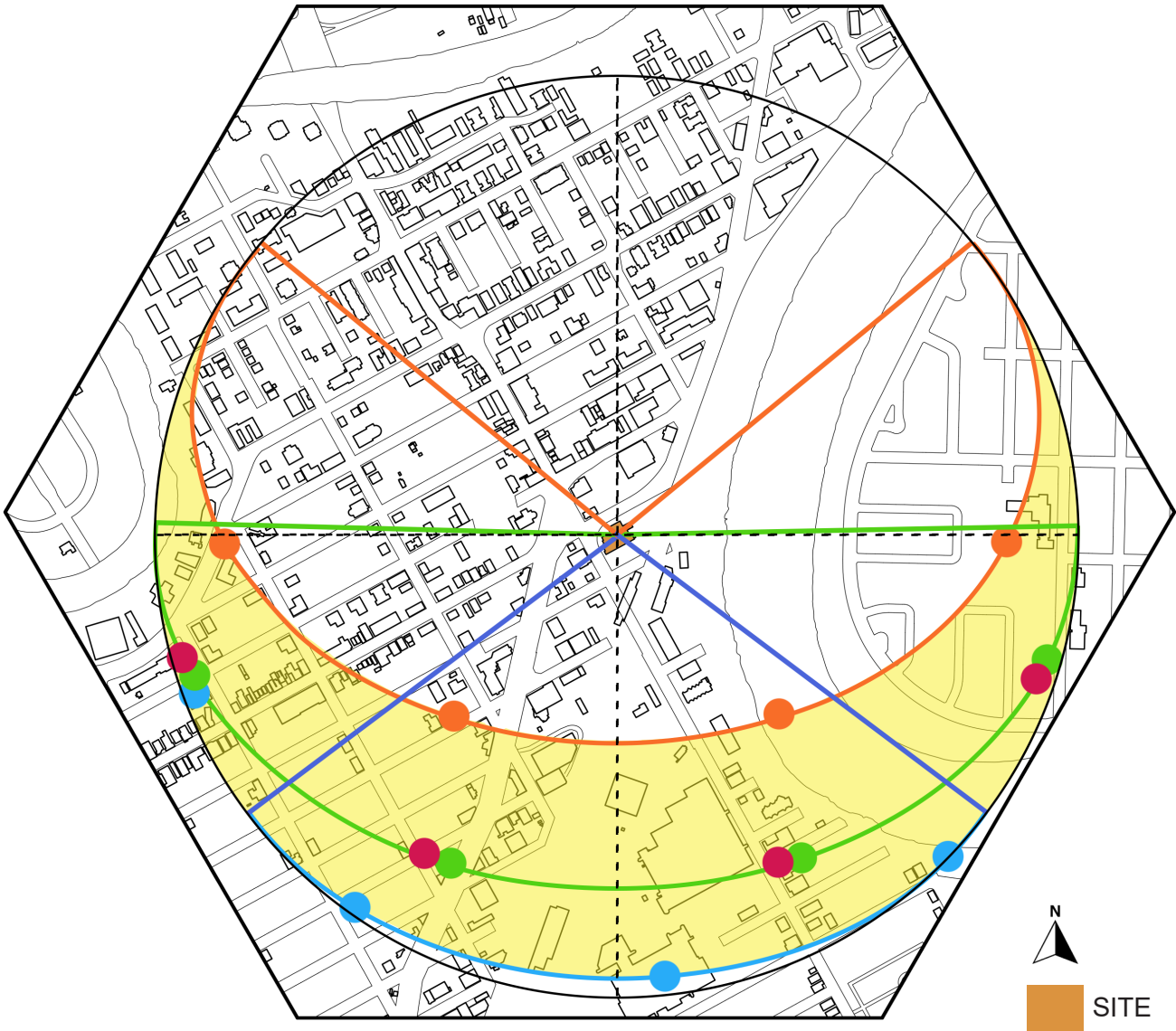


Figure 28: Sun Path Diagram NTS

- LEGEND
- | | |
|-----------------|----------------|
| Summer Solstice | Fall Equinox |
| Winter Solstice | Spring Equinox |

A sun path study was analyzed to determine how daylighting will impact the building. The study shows the sun's position during the summer and winter solstices, and the spring and fall equinox. The sun's position is taken at 9, 12, 15, and 18 hours, to show how much daylighting the building will receive during the different seasons throughout the year.

4.3.6 Demographics

All data was taken from the City of Winnipeg 2016 Census Data of the River-Osborne Neighbourhood.

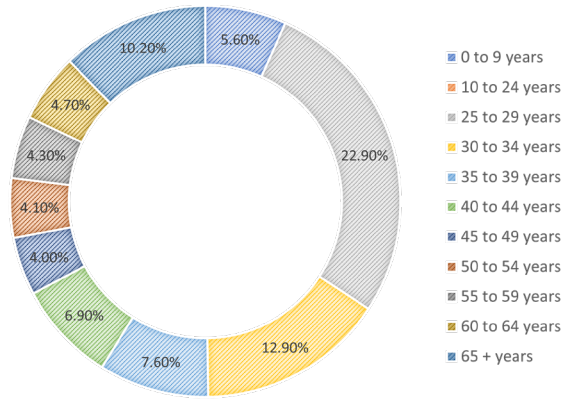


Figure 29: River-Osborne Population (The City of Winnipeg, 2016).

Population

The majority of the population of River-Osborne has graduated with either a high school diploma, or a post-secondary degree. (The City of Winnipeg, 2016).

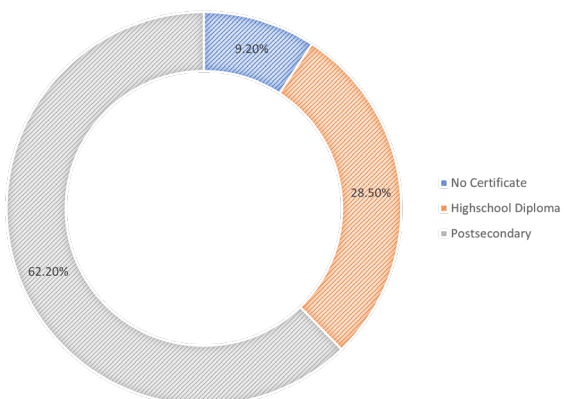


Figure 32: River-Osborne Education (The City of Winnipeg, 2016).

Education

The majority of the population of the River-Osborne area has graduated with either a high school diploma, or a post-secondary degree. (The City of Winnipeg, 2016).

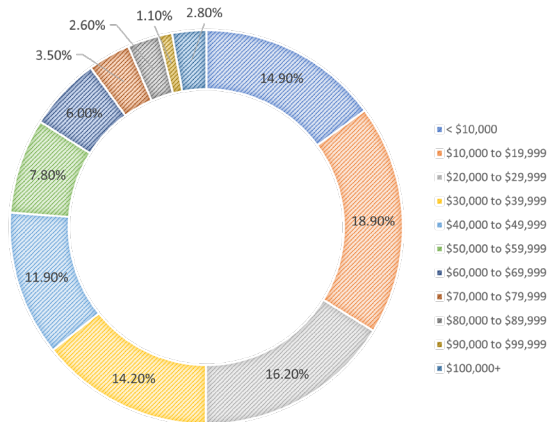


Figure 30: River-Osborne Individual Income (The City of Winnipeg, 2016).

Income (Individual)

The average individual income of the River-Osborne area is \$36,231 (The City of Winnipeg, 2016).

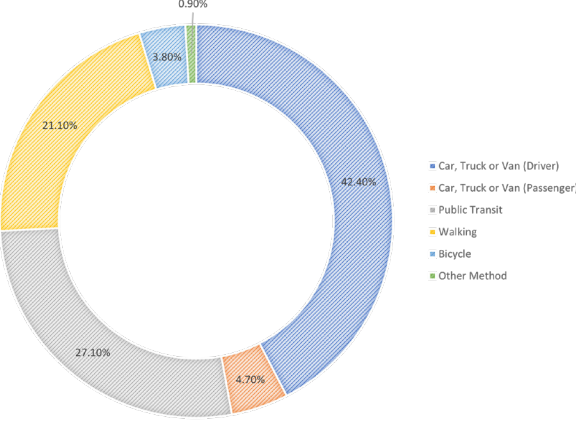


Figure 33: River-Osborne Transportation (The City of Winnipeg, 2016).

Transportation

Many modes of transportation are used within the population of River-Osborne. The most used mode of transportation to commute is a car, truck or van, while the second most used is public transportation (The City of Winnipeg, 2016).

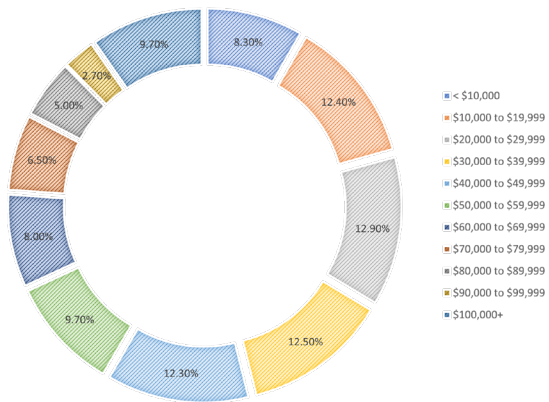


Figure 31: River-Osborne Household Income (The City of Winnipeg, 2016).

Income (Household)

The average household income of the River-Osborne area is \$51,402 (The City of Winnipeg, 2016).

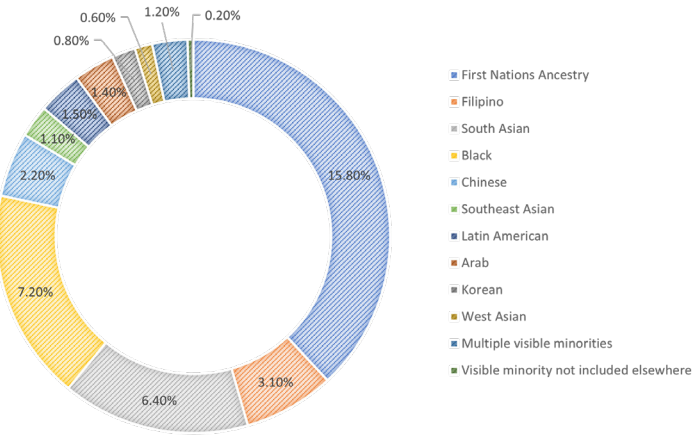


Figure 34: River-Osborne Ethnicity (The City of Winnipeg, 2016).

Ethnicity

This data shows that the River-Osborne neighborhood is very diverse with many people coming from different backgrounds. (The City of Winnipeg, 2016).

4.4 Building Analysis

The Masonic Memorial Centre was designed during the 1960s, with construction completed in 1969. The building was designed by Green Blankstein Russel Architectural firm. The existing building uses a heavy design language that utilizes large amounts of masonry. This design aligned with modern trends during the 1960s and '70s (Winnipeg Architecture Foundation, n.d). The design of the building also utilizes the idea of projecting forms; this helps to bring attention to the few entrances (Winnipeg Architecture Foundation, n.d). The building also utilizes minimal glazing, with most windows located higher up on the building (Winnipeg Architecture Foundation, n.d).



Figure 35: Masonic Memorial Centre – 420 Corydon Avenue, Winnipeg, MB

Design Summary

The existing building has a total area of approximately 21,000 square feet.

The building is composed of both a main floor and a lower basement area. It is comprised of many different rooms and areas, such as, rentable banquet halls, kitchen, office space, library, meeting spaces, and lodge meeting rooms, as well as storage spaces.

4.4.1 Site Photos

Exterior Building Photos:



Figure 36: East Facade



Figure 37: West Facade



Figure 38: North Facade



Figure 39: South Facade

Building Interior Photos:



Figure 40: Offices



Figure 41: Entrance Hall



Figure 46: Board Room



Figure 47: Office Storage



Figure 42: Entrance Hall



Figure 43: Library



Figure 44: Meeting Room



Figure 45: Meeting Room



Figure 48: Hallway



Figure 49: Exit Foyer



Figure 50: Stairs to basement



Figure 51: Stained Glass



Figure 52: Kitchen



Figure 53: Rentable Event Space



Figure 54: Stairs to Basement

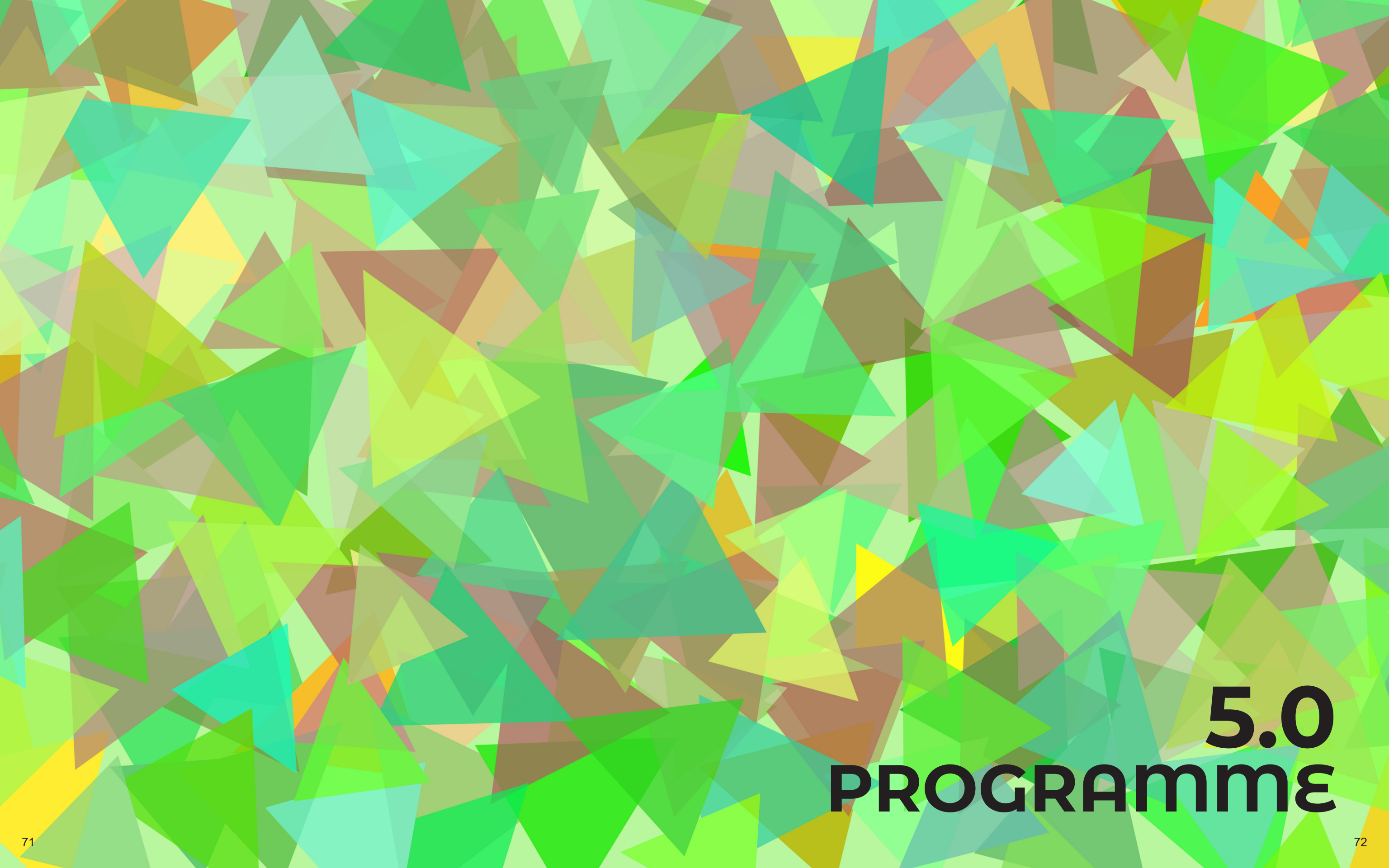
4.4.2 Building Opportunities and Constraints

Opportunities:

- The expansive masonry presents a unique design opportunity for the exterior of the building.
- The building is not designated as heritage and thus can be altered to meet current code requirements and create additions to the building more easily.
- The building is situated near the express busway and railway; this presents a potential landscape opportunity for the building.
- The building utilizes much push and pull opportunities to create a unique building façade.
- The site contains a large private parking lot that is adequate for the current design.

Constraints:

- The building does not have a lot of external glazing. An increase in glazing to the exterior façade will be needed to take advantage of the daylight as neighbouring buildings do not obstruct the building.
- The basement does not have any glazing and will need to be redesigned to open up the lower floor.
- The building does not have adequate square footage to accommodate the new program. Additions will need to be designed to accommodate for a larger program.
- Many rooms and spaces are outdated and do not meet current code requirements. These must be redesigned and updated to meet current trends and codes.
- The building only has a single main entrance and a dedicated exit on the North and South sides of the building respectively. The East and West facades contain a single staff entry/loading door, and a fire exit on the other. More doors will need to be designed into the building to ensure the building meets current fire exit and emergency code requirements.
- The current floorplan is of a closed design and does not efficiently use the space the building offers.



5.0 PROGRAMME

5.0 Programme

5.1 Proposal

MINDCRAFT LEARNING CENTRE:

The MindCraft Learning Centre is a proposal for a hypothetical learning resource centre based in the heart of Winnipeg’s Confusion Corner. This is an updated typology of a learning resource centre that is aimed at breaking the barrier between play and education. The resource centre will act as one large ecosystem. This ecosystem is created through the spaces found throughout the three floors: makerspaces, social spaces, and learning spaces, which are all under the umbrella of Play. The learning resource centre is focused towards cultivating creative learning within people, to create the next generation of innovators. The building will include public programming and recreational activities and events to attract more visitors and encourage collaboration among peers. The idea is to create a collaborative, safe, and secure place for anyone to work, research, learn, hang-out, and explore while remaining close to valuable resources and tools needed to cultivate any passion. The building will be situated on the South-East corner of Corydon Avenue and Osborne Street. The site is located near the center of Winnipeg, making it equally accessible to the entire population of Winnipeg.

Location: 420 Corydon Avenue, Winnipeg, Manitoba, Canada

Existing Total Sqft. 21,000 Sq. Ft.

5.2 Client Profile

Client: MindCraft Learning Centre

Current Needs:

To create a space for both the general public and academics that can support and nurture learning through creativity, exploration and collaboration

Future Goals:

This hypothetical proposal is a challenge for the current education system to adapt to include the freedom of exploration and playfulness. Through collaboration, the MindCraft Learning Centre aims to break barriers between different disciplines and people from varying walks of life and experience. This will allow for multiple-user groups to interact and collaborate. The centre also aims to reinvigorate the chosen site and attract more visitors. The goal of the MindCraft Learning Centre is to inform others of the benefits to playful learning and the idea of play itself. By introducing a learning centre that is based on the ideas of play, the building design hopes to nurture creative thinking within people and eventually improve Winnipeg’s local communities.

5.3 User Profile

Primary Users	Ages	Gender
- Academics - Administration Staff - Operations Staff - Students - Tenants - General Public	(18+) (18-65) (24-65) (16-35) (18+) - All Ages	All Genders
Secondary Users	Ages	Gender
- After Hours Cleaning Staff - Clients or external Exhibitors	(18+)	All Genders
Primary Users	Ages	Gender
- Maintenance Staff - External Groundskeepers - Delivery Personal	(18+)	All Genders

Table 13: User Behavioural Needs

User	Activity	Frequency	Duration
Academics	Individual Work or Research	As frequently as the user defines or needs the facilities / resources.	As needed by the individual user
Students	Individual Work or Research	As frequently as the user defines or needs the facilities / resources.	As needed by the individual user
Tenants	Individual Work or Research	As frequently as the user defines or needs the facilities / resources.	As needed by the individual user
Administration Staff	- Booking of Rental Space - General Management of the facilities - Answer all inquiries - Writing and handling contracts	7 days a week	8 hours/day on shifts

User	Activity	Frequency	Duration
Operations Staff	Operates and maintains all systems within the facility	7 days a week	8 hours/day on shifts
General Public	Visits the centre to utilize its amenities, resources, and recreational activities.	As frequently as the user defines or needs the facilities / resources.	As needed by the individual user

Table 14: User Physiological Needs

User	Values	Aesthetic Preferences	Privacy Needs
Academics	- Hardworking - Privacy - Highly Motivated - Places to quietly work	- Neat - Clean - Organized - Minimalist spaces	- Secure storage for personal belongings and work. - Private spaces for confidential work.
Students	- Hardworking - Social - Place to study during free time - A place to socialize and relax	- Fun - Organized - Functional - Spaces - Interesting forms and spaces	- Secure storage for personal belongings and work. - Private spaces for confidential work
Tenants	- Social - Hardworking - Helps others - Inspired by others - Flexible (can come and go as they please)	Open Clear Space (Can design their rented space as long as it is not structural)	- Secure storage for personal belongings and work. - Private spaces for confidential work.
Administration Staff	- Dedicated - Hardworking - Helpful - Highly social - Caring	- Organized - Clean - Functional and efficient spaces	Secure storage for personal belongings and documents.
Operations Staff	- Efficient - Attentive - Organized - Detail oriented	- Organized - Clean Spaces - No open hazards - Easily accessible spaces	Secure storage for personal belongings and equipment
General Public	- Inspirational - Motivated - Creative - Social	- Fun & Playful - Directional forms & Spaces - Organized	Private spaces if needed

Table 15: User Physiological Needs Continued

User	Sensory Needs	Socialization Needs
Academics	- Well lit-spaces - Quiet Space	- Private Spaces - Quiet Spaces
Students	- Well lit-spaces - Quiet Space	- Private Spaces - Social Spaces - Learning Space
Tenants	- Well lit-spaces - Quiet Space - Clean Space	Private and Collaborative spaces
Administration Staff	- Well lit-spaces - Quiet Space - Clean Space	- Private space for work - Social Space for working with clients
Operations Staff	- Well lit-spaces - Quiet Space - Cleanable spaces and materials	No special socialization spaces as they operate the facility
General Public	- Well-lit spaces - Tactile environments - Interactive environments	- Private Spaces - Quiet Spaces - Social Spaces - Activity Spaces

Table 16: User Spatial Needs

User	Visual	Cognitive	Mobility
Academics	- Well-lit work space - Exterior views for natural light	- Logical work space - An efficient work space for ease of work flow - A safe place to work	- Enough space to comfortably work and move within - A quiet or private space
Students	- Well-lit work space - Exterior views for natural light - Clear sight of everything around them	Comfortable work spaces and social spaces	- Signs for easy way-finding within the facility - Clear paths of circulation - Space to both work and socialize
Tenants	- Bright well-lit spaces - A view of the exterior environment	- Large work spaces - Secure environments	- Must have a clear path of circulation to their rented space - Emergency exit paths
Administration Staff	- Clear lines of site to everything around them - View of the exterior	- An efficient work space for ease of work flow - A safe place to work	- Must be able to assist users in a quick manner - Clear paths of circulation
Operations Staff	Bright well-lit spaces	Clean spaces	- Signs for wayfinding - Clear paths of circulation around the facility - Large spaces to operate and maneuver heavy equipment
General Public	- Bright well-lit spaces - Clear lines of site to everything around them - View of the exterior	- Comfortable spaces for socializing - To feel safe and secure - Cleanliness	- Signs for Wayfinding - Open large circulation so they do not feel crowded

5.4 Building Requirments

Table 17: Functional and Aesthetic Requirements

Space	Sq.Ft.	FF&E	Colour & Material	Desired Atmosphere
Wood Shop	750-1000 Sq.Ft	- Seating - Tables - Wood Racks - Planer - Jointer - Workbenches - Footlockers - Table Saw - Router Table - Miter Saw - Chests - Drill Press	- Natural Colours - Easy to clean Materials	- Accessible - Open - Efficient
Studio Space	750-1000 Sq.Ft.	- Seating - Desks - Task-Lighting - Storage Units	- Multiple textures - Natural Colours - Clean and open	- Functional - Efficient - Open - Stimulating
Metal Shop	750-1000 Sq.Ft	- Seating - Tables - Storage units - Water Bed cutter - Band Saw - Lathe - Welder - Belt Sander - Sheet Metal - Brake	- Multiple textures - Natural Colours - Easy to clean materials	- Quiet - Warm - Inviting
3D Print Room	750 Sq.Ft.	- Tables - Seating 3D Printers - Storage/ Shelving	- Multiple textures - Natural Colours - Easy to clean materials	- Warm - Inviting - Open

Space	Sq.Ft.	FF&E	Colour & Material	Desired Atmosphere
Computer Lab	750-1000 Sq.Ft.	• Seating • Tables • Computers	• Multiple textures • Natural Colours • Clean and open	• Functional • Efficient • Open • Stimulating
Multipurpose Room	750-1000 Sq.Ft.	• Seating • Desks • Task-Lighting • Storage Units	• Multiple textures • Natural Colours • Clean and open	• Functional • Efficient • Open • Stimulating
Lazer Cutting Room	750-1000 Sq.Ft	• Seating • Tables • Task & Ambient Lighting • Computers • Shelving Units	• Multiple textures • Natural Colours • Easy to clean materials	• Quiet • Warm • Inviting
Design Hub	750-1000 Sq.Ft.	• Tables • Seating	• Multiple textures • Natural Colours • Clean and open	• Warm • Inviting • Open
Tool Room	100 Sq.Ft	• Storage • Shelves • Wall Hooks	• Unfinished	• N/A
Photography Studio	500 Sq.Ft.	• Studio Lighting • Light Boxes • Backdrops	• Neutral	• Open • Accessible
Textile Shop	500 Sq.Ft.	• Tables • Workbench	• Multiple textures • Natural Colours • Easy to clean materials	• Quiet • Warm • Inviting

Space	Sq.Ft.	FF&E	Colour & Material	Desired Atmosphere
Recording Booth	500 Sq.Ft.	• Acoustic panels and materials • Workstations • Instruments • Recording Area	• Multiple textures • Natural Colours • Easy to clean materials	• Quiet • Warm • Inviting
Electronic Shop	500 Sq.Ft.	• Tables • Seating • Workbenches • Tools	• Easy to clean materials	• Quiet • Inviting
Cafe/ Restaurant	2000 Sq.Ft.	• Seating • Tables	• Multiple textures • Natural Colours • Clean and open	• Functional • Efficient • Open • Stimulating
Kitchen	750-1000 Sq.Ft.	• Workbench • Assembly • Serving • POS • Counterspace • Cooking • Appliances • Storage • Shelving • Freezer • Fridge Space	• Multiple textures • Natural Colours • Clean and open	• Functional • Efficient • Open • Stimulating
Bar	500 Sq.Ft	• Bar • Counter • Drink Ma-chines	• Easy to clean materials • Multiple textures	• Open • Inviting
Library	750-1000 Sq.Ft.	• Shelves • Seating • Tables	• Multiple textures • Natural Colours • Clean and open	• Functional • Efficient • Open • Stimulating

Space	Sq.Ft.	FF&E	Colour & Material	Desired Atmosphere
Study Rooms/ Carols	100-300 Sq.Ft.	• Seating • Desks • Task-Lighting	• Multiple textures • Natural Colours • Clean and open	• Functional • Open • Stimulating
Reading Lounge	750-1000 Sq.Ft	• Seating • Tables • Task & Ambient Lighting • Computers • Shelving Units	• Multiple textures • Natural Colours • Easy to clean materials	• Quiet • Warm • Inviting
Meeting Rooms	250 - 500 Sq.Ft.	• Tables • Seating	• Multiple textures • Natural Colours • Clean and open	• Warm • Inviting • Open
Theatre/ Auditorium	2000 Sq.Ft	• Tables • Seating • Screen • Projector • Stage	• Multiple textures • Natural Colours • Clean and open	• Open
Entry/ Reception	500 Sq.Ft. per Entry	• Doors • Reception desk	• Hardware • Steel, Glass	• Welcoming
Administrative Offices	200 Sq.Ft./ office	• Desk • Office Chair • Shelving, Cabinets	• Neutral Colours • Carpeted Floors • Warm Tones	• Private • Warm • Functional • Efficient
Security Room	200 Sq.Ft	• Desk • Office Chair • Equipment • Storage	• Natural Colours	• Safe • Secure
Lounge Areas	750-1000 Sq.Ft.	• Shelves • Seating • Tables	• Multiple textures • Natural Colours • Clean and open	• Functional • Efficient • Open • Stimulating

Space	Sq.Ft.	FF&E	Colour & Material	Desired Atmosphere
Open Studio	1000 Sq.Ft	• Mirrors • Large Windows • Natural Lighting	• Neutral Colours • Carpeted Floors • Warm Tones	• Semi-Public • Warm • Functional
Workshop Spaces	750 Sq.Ft	• Large Table • Modular seating	• Neutral Colours • Carpeted Floors • Warm Tones • Task Lighting	• Private • Warm • Functional • Efficient
Exhibition Area	1000 Sq.Ft	• Seating • Tables • Displays • Spot-Lighting	• Natural Colours • Easy to clean Materials	• Inviting • Open
Janitor Room	100 Sq.Ft	• Ground Drain • Equipment • Storage	• Concrete • White	• Unfinished
Washrooms	800 Sq.Ft..	• Water Closets • Sink • Dryers • Soap Dispensers • Mirrors	• Easy to clean materials • Natural Colours	• Clean • Sterile
Mechanical Room	100 Sq.Ft.	• Storage for equipment • Shelves	• Storage • Shelves • Wall Hooks	• Unfinished
Loading Bay	300 Sq.Ft.	• Garage door	• Concrete	• Unfinished
Storage	1000 Sq.Ft	• Storage • Shelves • Wall Hooks	• Concrete	• Unfinished
Staff Room	500 Sq.Ft	• Tables • Seating • Kitchenette • Fridge • Shelves, Cabinets • Television/ Entertainment Unit	• Industrial Materials • Steel • Brick • Ambient Lighting	• Warm • Inviting • Relaxing • Comfortable • Cozy

Space	Sq.Ft.	FF&E	Colour & Material	Desired Atmosphere
Staff Lounge/ Kitchen	500 Sq.Ft.	• Stove • Table • Island Microwave, oven, etc.	• Neutral Colours • Easy to clean Materials • Warm Tones	• Clean • Accessible • Open
Server Room	300 Sq.Ft	• Cooling Systems • Server tower shelving	• Concrete • White	• Unfinished

Approximate Square Footage Required:

Maximum: 26,800 sqft.
Total: 21,440 sqft.
Circulation: 20% of maximum.

5.5 Spatial Adjacency and Stacking Diagrams

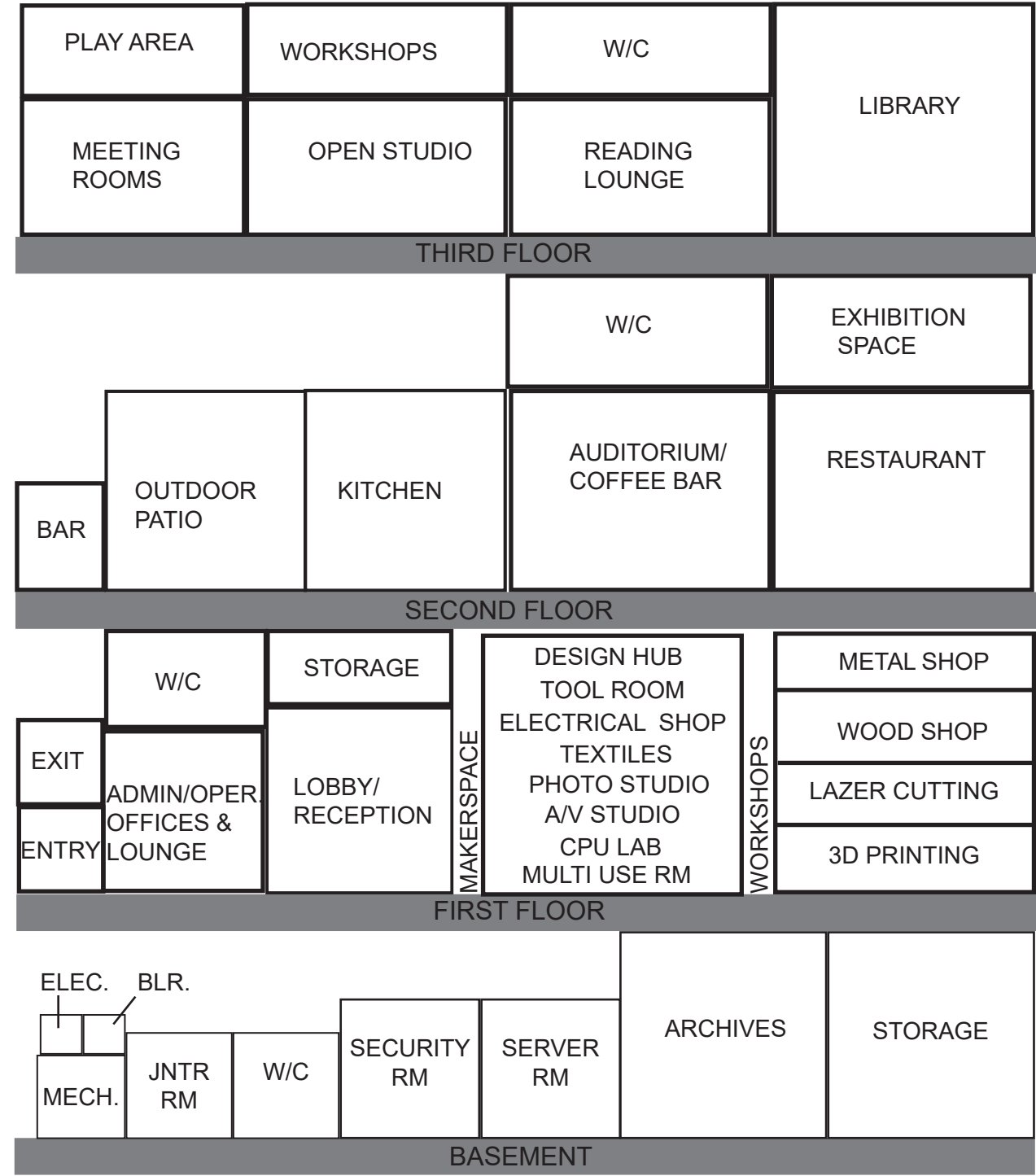
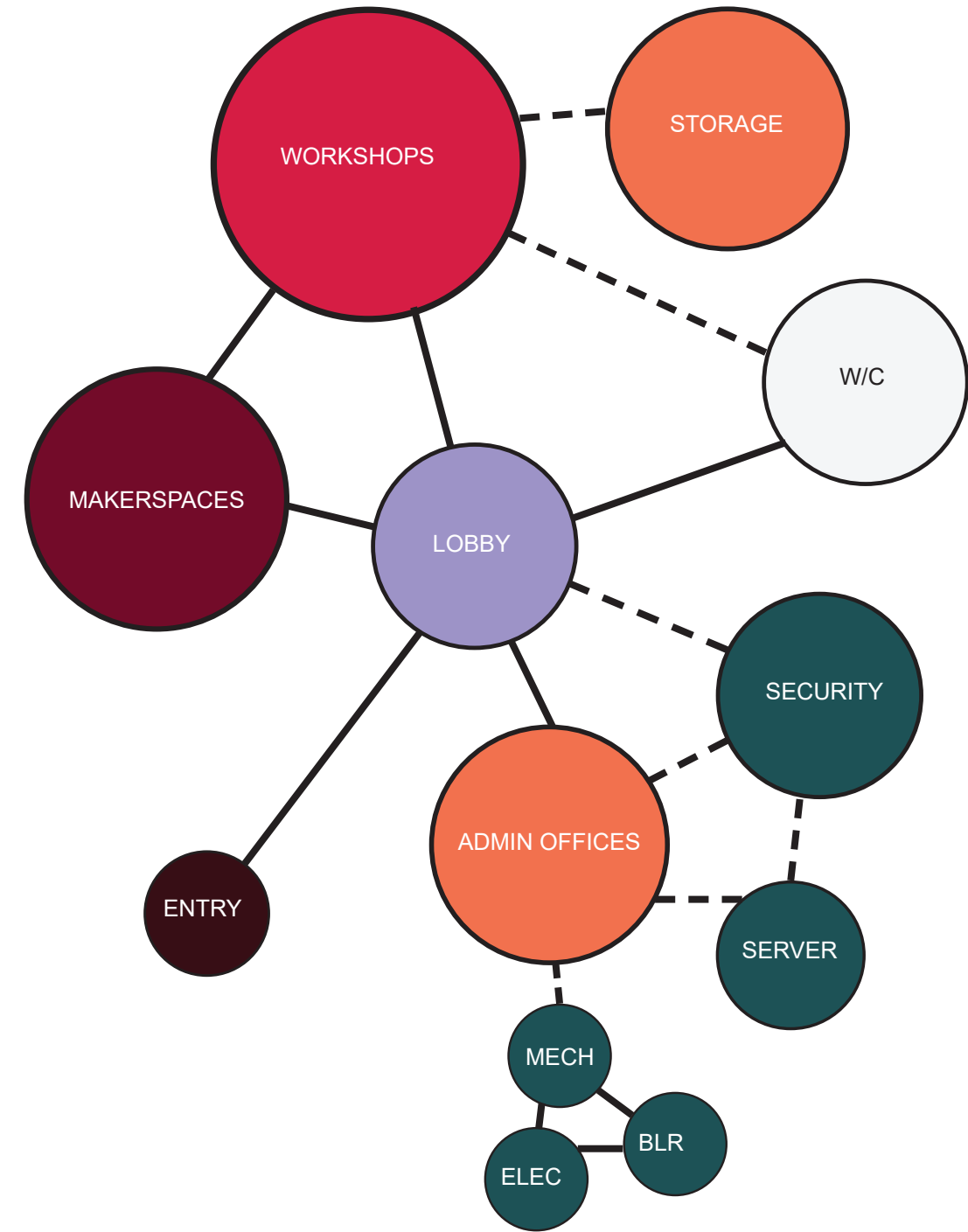


Figure 55: Stacking Diagram

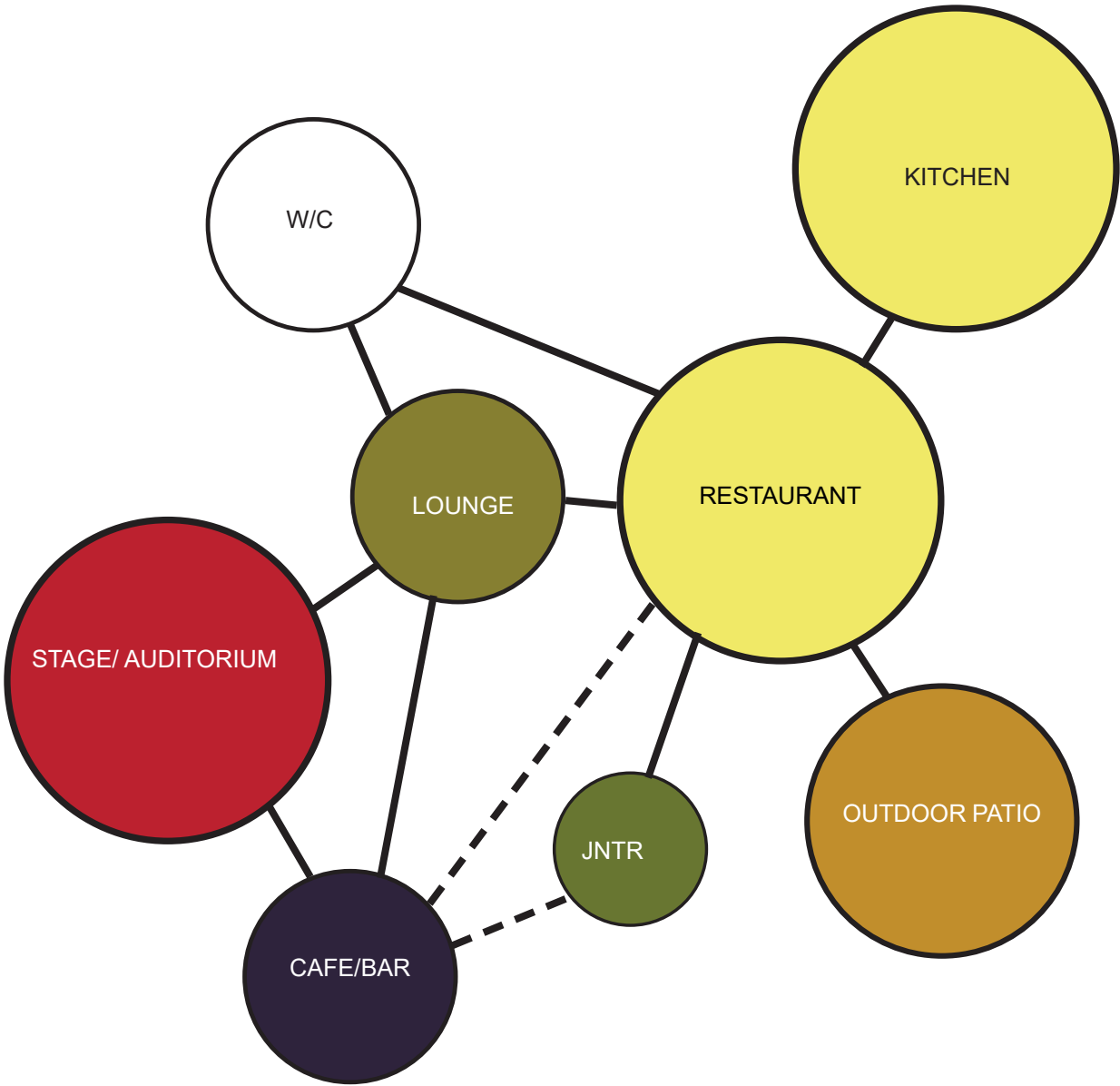
Spatial Adjacency: First Floor



MAJOR ADJACENCY
MINOR ADJACENCY

Figure 56: First Floor Spatial Adjacency Diagram

Spatial Adjacency: Second Floor



MAJOR ADJACENCY
MINOR ADJACENCY

Figure 57: Second Floor Spatial Adjacency Diagram

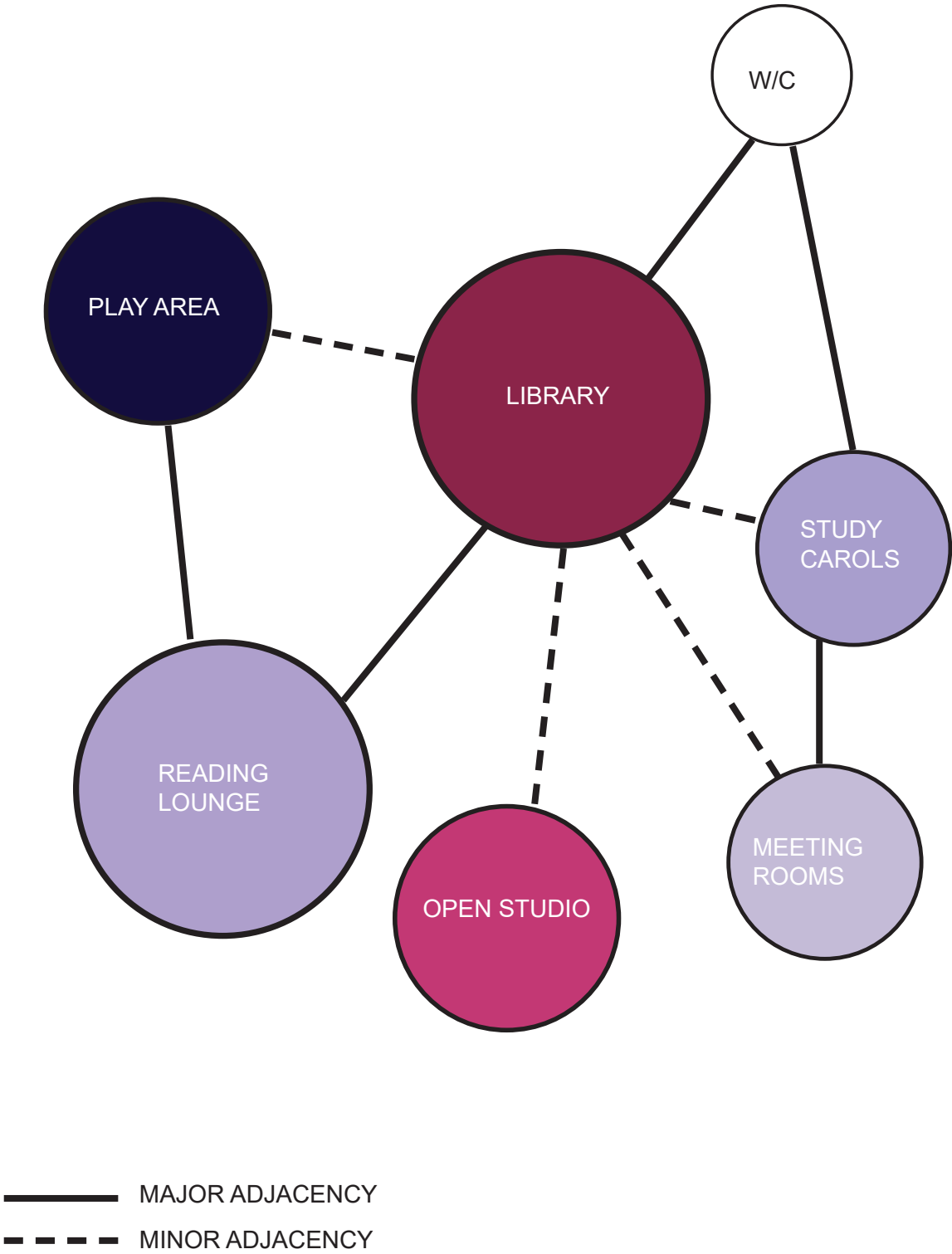


Figure 58: Third Floor Spatial Adjacency Diagram



6.0 DESIGN PROPOSAL

6.0 Design Proposal

6.1 Design Concept and Ideation

Design Concept:

This practicum is focused on the idea of learning through exploration, collaboration, and play. To promote learning through play, the design concept is based off playscapes. Playscapes are places where people go to play, hang-out, and have fun. The idea for MindCraft is to combine multiple typologies, two of which are a library and a makerspace. Thus, MindCraft is a place that challenges one's mind and allows them to craft and make things based on what they have learned.

The concept for the programme of the MindCraft Learning Centre is for users to use the facilities to learn new skills and knowledge, produce things based on that newfound knowledge, and then collaborate and iterate on it. The three environments that are included within the design comprise of the makerspace, a social area for collaboration, and the library. The third floors programme consists of multiple reading areas, the library, and a few spaces for collaboration and more creative activities such as art, pottery, dance, and theatre. The second floors programme is designed to be social hub, a place where a visitor can go to relax, meet new people, and discuss new topics of interest. This space consists of a large café, a smaller coffee bar, a stage area for presentations and seminars, and an exhibition area to showcase local work or work made in house. This space also features a large reading staircase that acts as a hangout or rest space when navigating to the third floor. The first floor consists of the makerspace areas. This floor features spaces such as woodshops, metal shops, computer labs, a design, hub, studio space, and a textiles space. Most of the administration spaces are also located on this floor acting as a private area for staff of the complex.

For the MindCraft learning centre, Play is at the core of everything it offers, including how users interact with each programme and space. This allows visitors to have fun while learning, while also creating an updated model for a learning resource center. With the design concept focused on the idea of play, the typology of the playscape is used as a base for the design. The playscape is flexible, it can accommodate for almost any type of play and exploration depending on what is put into it. When creating the programme for the MindCraft learning centre, the focus was to design it closer to that of a playscape. This meant including a variety of spaces that can adapt to different types of play. In this project, four types of play are used when designing the programme of the space. Functional play includes spaces that encourage people to take risks and challenge themselves. Constructive Play allows users the freedom to experiment and discover new things. Dramatic play is the type of play that engages people in creating narratives, stories, and allows them to act it out. Finally, games, which are activities that encourage competition and teamwork. The design concept is based on these types of play which inform what kind of spaces must be included within the building. The framework of the Four P's for Creative Learning inform what should be included within each space, ranging from the size and shape of each space, to the furniture and material selection of each space.

6.2 Schematic Design Drawings and Sketches

The external form concept was created using the buildings programme. First, the building was extruded two floors to accommodate for the large programme, and to separate specific activities within the building. Once extruded, three strategies were used to shape the addition. The first strategy used was to step-back each additional floor, so the original building stands out the most acting as a heavy base. This also helps the building to not be imposing to those on the ground level when approaching the building. The second strategy used was to incorporate more glazing. By using large amount of glass, the building can have a 'light' appearance even though the addition is large. The third strategy was to incorporate materiality that blends well with the original Tyndall brick of the masons. The addition to the building is created using basalt bricks and black exterior grade steel. The use of neutral colors allows the bright beige Tyndal brick to stand out, while the two bricks can be incorporated together and blended.

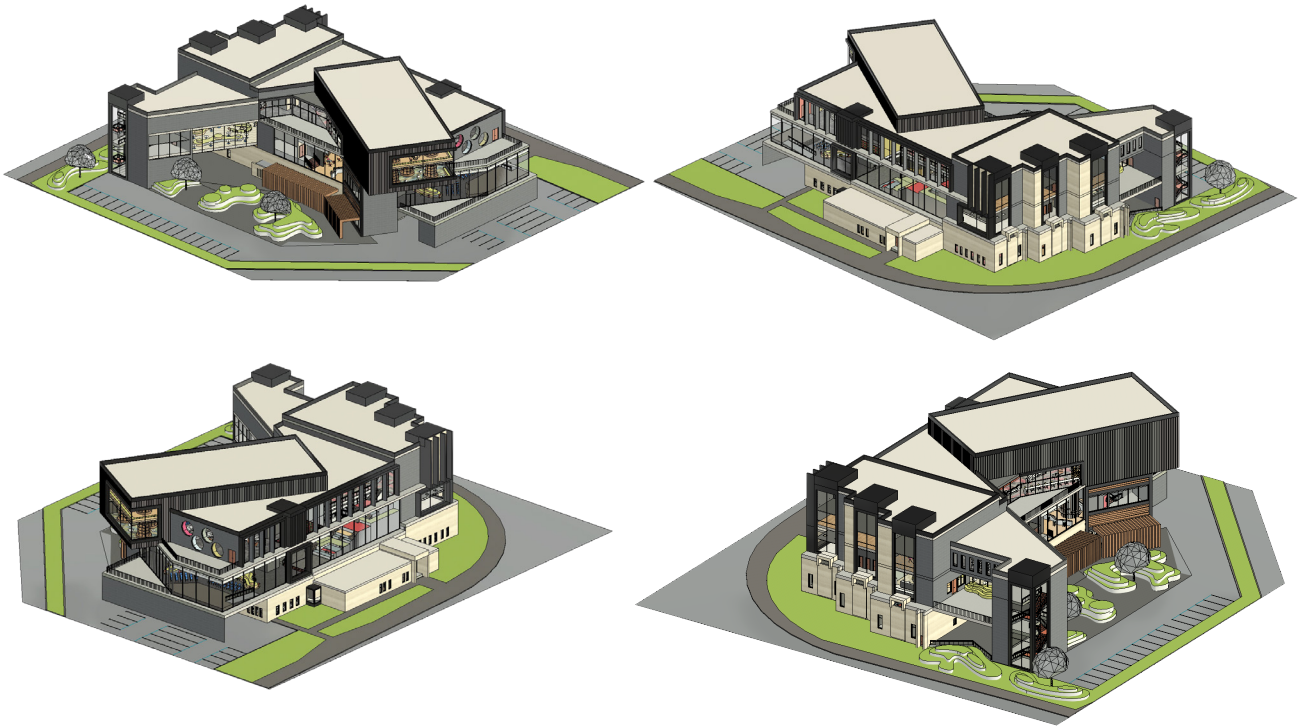
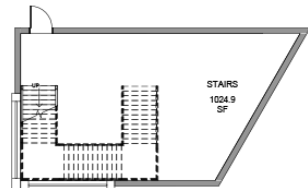
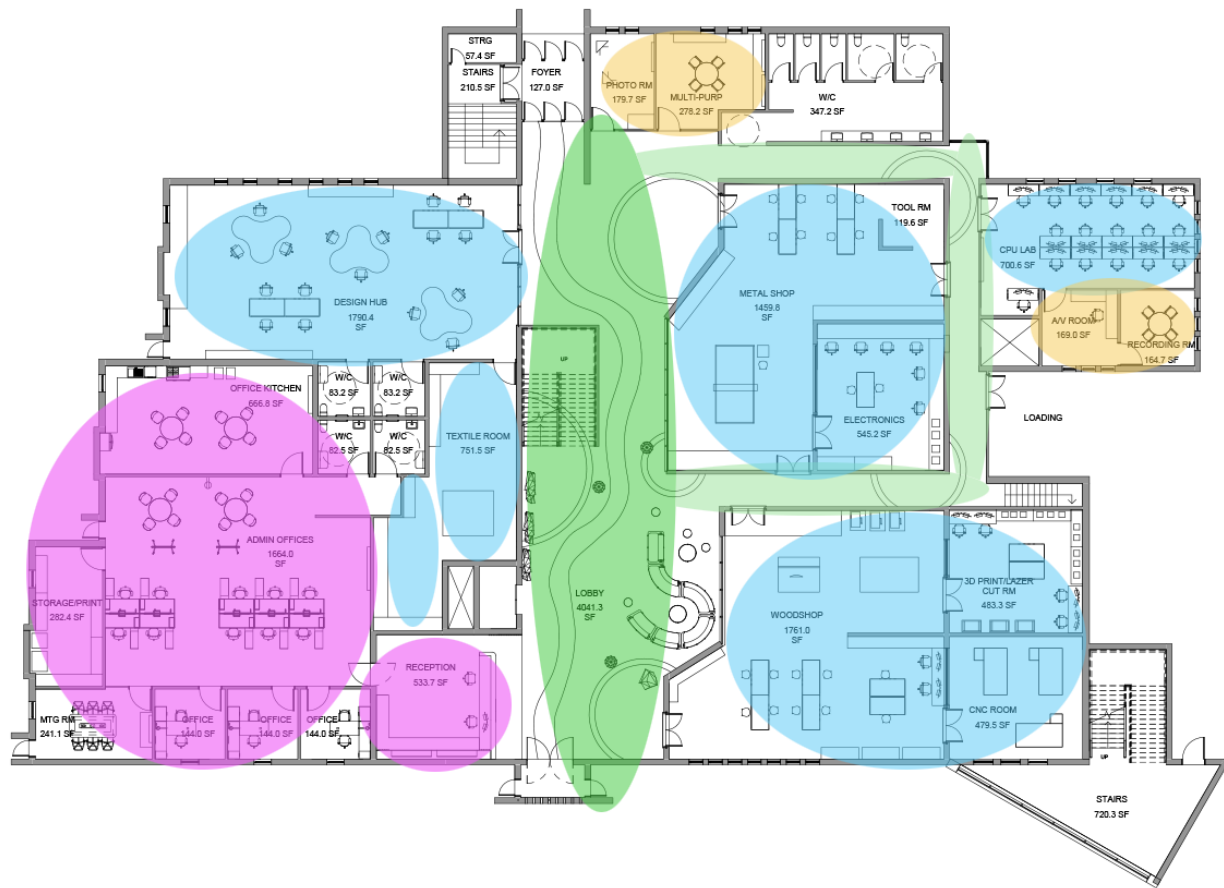


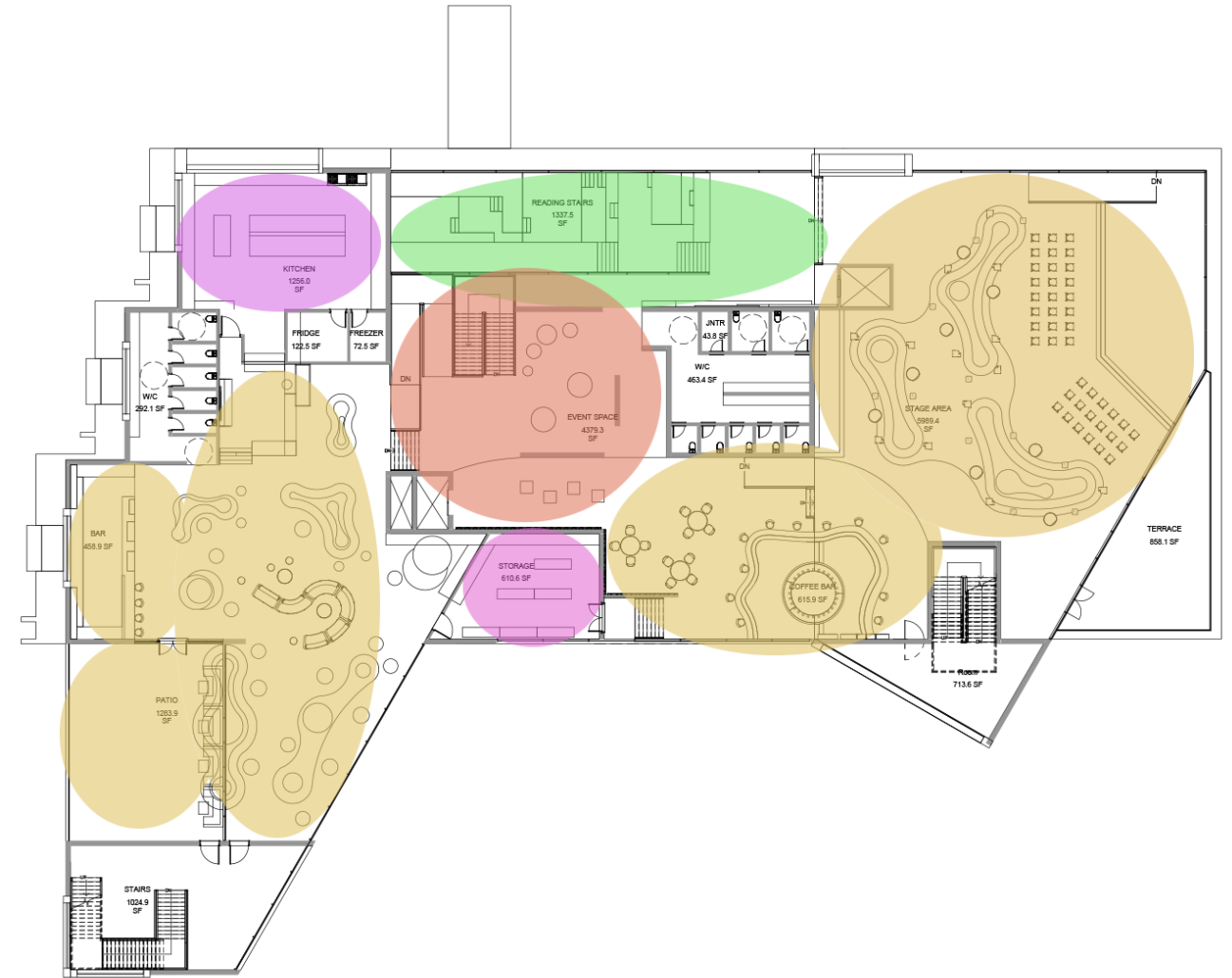
Figure 59: Exterior Form Proposal



LEGEND

- Functional Play
- Game Play
- Dramatic Play
- Constructive Play
- Support Spaces

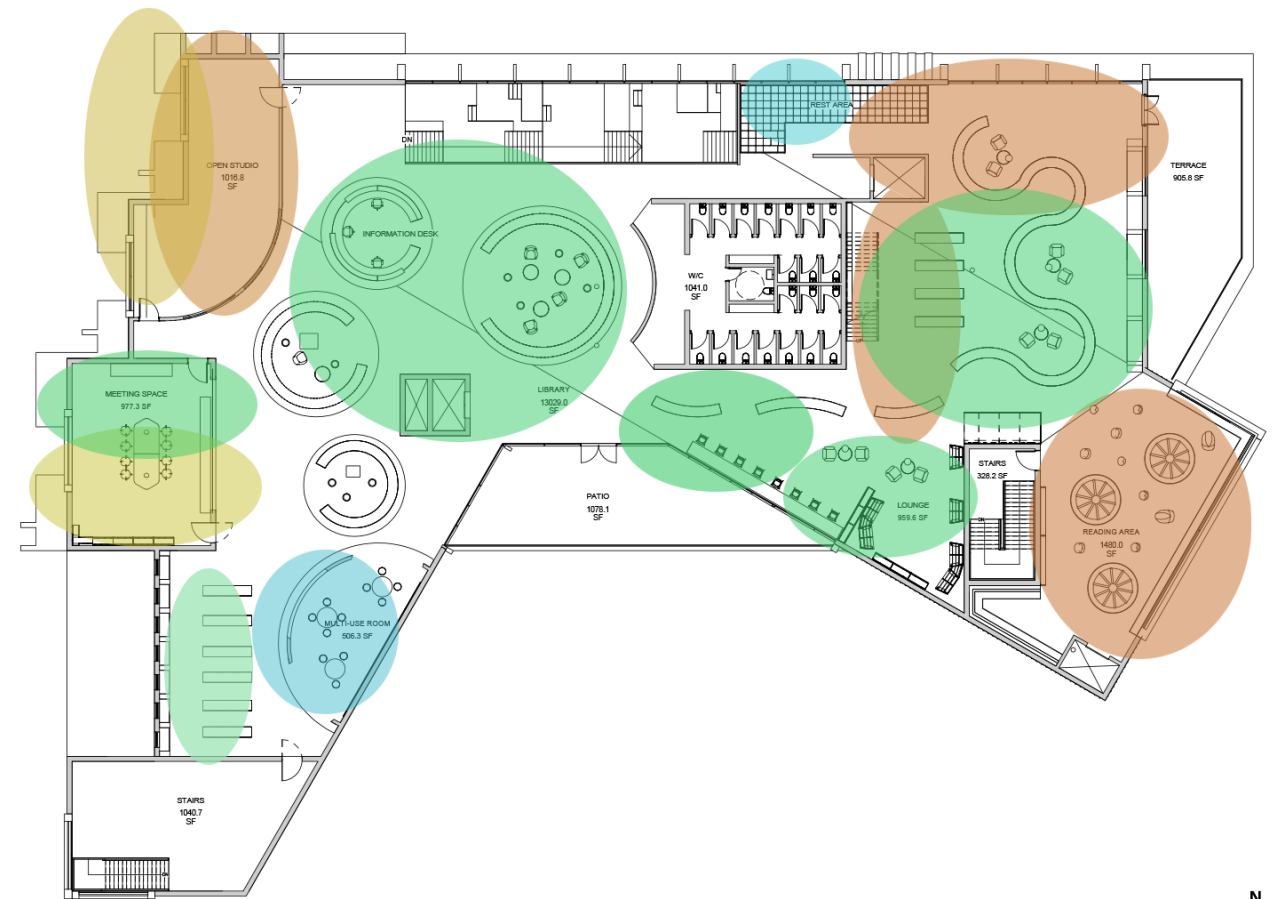
Figure 60: First Floor Spatial Diagram



LEGEND

- Functional Play
- Game Play
- Dramatic Play
- Constructive Play
- Support Spaces

Figure 61: Second Floor Spatial Diagram



LEGEND

- Functional Play
- Game Play
- Dramatic Play
- Constructive Play
- Support Spaces

Figure 62: Third Floor Spatial Diagram

6.3 Site Plan



LEGEND

- Proposed Building Site
- Existing Buildings
- Roads and Pathways
- Landscape

Figure 63: Site Proposal

6.4 First Floor Design



Figure 64: First Floor Plan NTS

When designing the interior of the building, the programme was thought of first. The building was split into three separate programmes among the three floors. Each floor houses a specific purpose within the building. The first floor is dedicated to the makerspaces and administration spaces. The three main spaces of the first floor are comprised of the wood shop, metal shop and design hub. These spaces are designed and organized for efficiency and ease of use for new users. This floor’s materiality mainly uses beige Tyndall stone brick. This reflects the exterior of the building acting as a bridge between the exterior and interior spaces.



Figure 65: First Floor

Figure 65 depicts what a visitor will see upon entry to the building. Within the main atrium/ lobby space, the visitors will find the reception desk directly to their left upon entry (figure 66). On the right, they will find the woodshop and metal shop. These spaces have windowed safety glass sections along the perimeter so visitors can see what happens within the makerspaces. Through the atrium, there is a water-like shape of black marble flooring material. The shape of this material is to reflect the Red-River which sits to the East of the building’s location. The black-marble flooring also acts as a wayfinding element as it guides the visitor through the first floor. Surrounding the black-marble is vinyl composition tile. This allows the black marble design to standout and become a point of focus to the eye. The main staircase to the second floor is also located within the main atrium of the first floor.

The reception desk is located right next to the entry of the building just past the exterior vestibule. The reception desk and its surroundings are clad in wooden elements. The wood elements showcase how the building can improve itself by using its own spaces. These elements were created by the building’s own woodshop. The desk also features an accessible counter alongside a taller counter for standing.



Figure 66: First Floor Reception

6.5 Second Floor Design

The second-floor programme is designed as a social space. This floor contains a café, coffee bar, exhibition space, stage area, and the reading stairs that lead to the third floor.

The second floor's design elements take on a more freeform shape. This is due to the programme being more playful in design. These shapes create built in seating that is climbable and encourages visitors to run around, climb, jump, and explore. This design also encourages users who don't know each other to potentially sit next to each other, as there is not a lot of secluded seating areas meant for small groups of people. The second floor also is made up of three different bi-levels. The lowest area features the stage area, and the mid-level spaces contain the coffee bar and exhibition spaces. The highest level houses the café.

The cafe is a wide-open space featuring both a bar and a regular ordering area. This space also features free-form shaped seating that is built and meant for encouraging non-traditional seating. These forms are made to mimic miniature hills that you can find in a park's open field. This allows the café to feel more open much like a field. The café also features an outdoor patio that faces Osborne Street. The ceiling features a hexagonal light system that acts as both ambient lighting and a piece of design focus for the vertical space.



Figure 67: Second Floor Plan NTS



Figure 68: Café Lobby



Figure 69: Second Floor Café Elevation NTS



Figure 70: Coffee Bar



Figure 71: Second Floor Coffee Bar Elevation NTS

The coffee bar is made to mimic a tree. It is split between the first and second bi-levels. The counter is shaped like the seating, free-form. The seating area of the coffee bar is designed with a wooden feature wall. This wall also showcases what can be made utilising the first floor's woodshop.



Figure 72: Exhibition Area

The second floor also showcases the exhibition area, reading stairs, and stage area. The exhibition area, as shown in figure 72, is currently shown as a local art exhibition. However, this space is created using temporary partitions and pedestals that can be changed and moved to fit the event.

The reading stairs, as seen in figure 73, are the main access to the third floor. These stairs are located along the north perimeter wall against the exterior glazing. Here, people can sit, relax, read, and socialize on different levels of the stair-case while taking in the view of Corydon and Osborne.

The stage area (figure 74) is designed much like the café with hill-like, built-in seating. The ceiling elements feature large circles of differing sizes. These circles are made to contrast the free-form seating shapes and house downlight spot lighting to create more focused attention upon the seating areas and stage.



Figure 73: Reading Stairs



Figure 74: Stage Area

6.6 Third Floor Design

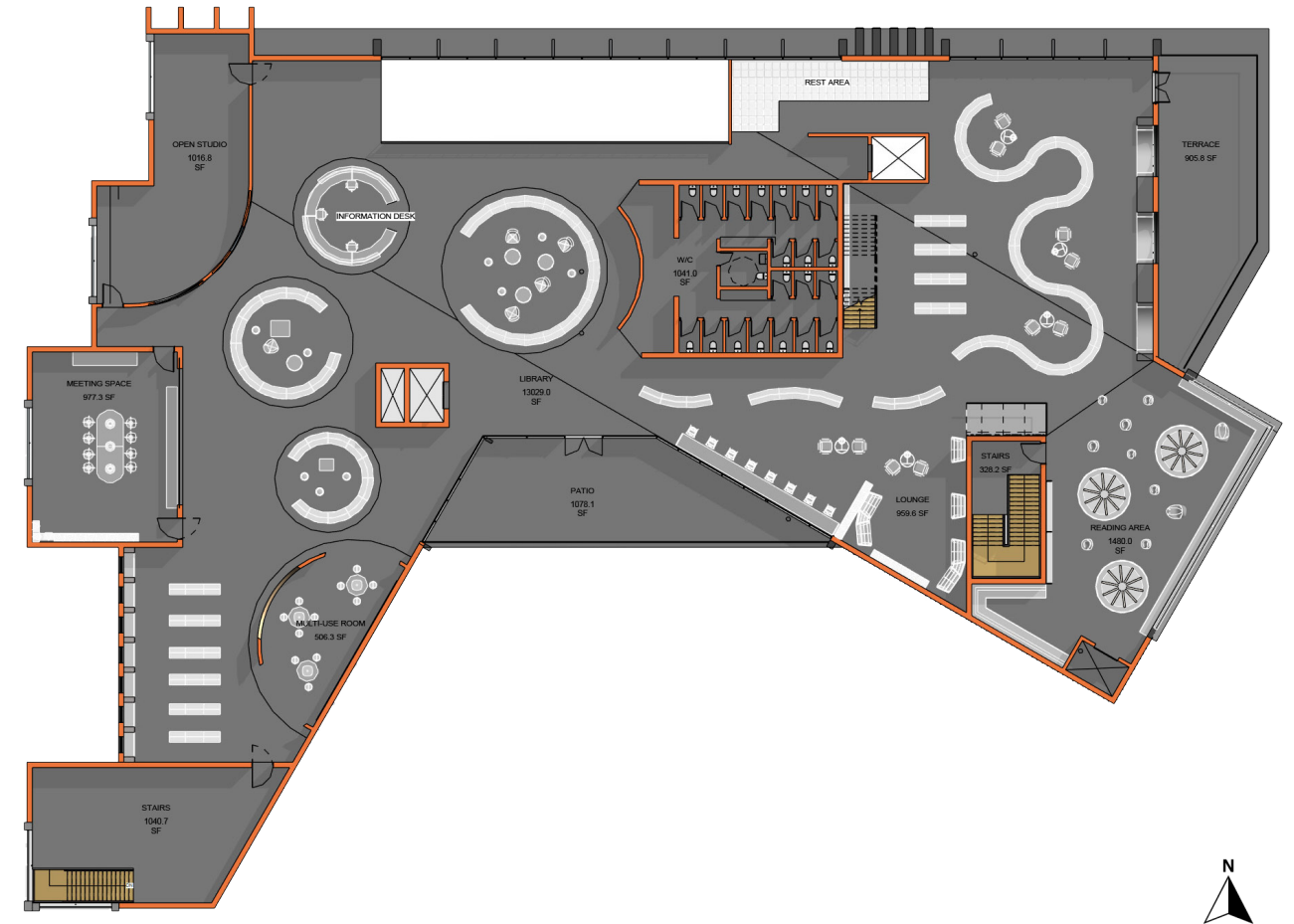


Figure 75: Third Floor Plan NTS

The third floor is designed to house the library space and other spaces meant for creative activities, such as a multi-purpose area and open studio. The third floor is designed using a more circular design language in juxtaposition to the exterior's angular and harsh lines.

The library is made of circular bookshelves of varying sizes. In the center of the bookshelf areas is a seating area. The bookshelves act as both a storage for the books but also as a way of separating the seating areas from the traffic of people moving around.

The library information desk is located at the top of the reading stairs (figure 76). From here, visitors can see the library lounge, circular reading areas and shelves, and the multipurpose room.

The multipurpose room is designed to be open with large semi-circular cutouts (figure 77). This is to allow passersby to view what is happening in the room. Visitors can also sit within the walls' ledges and move between the room and other spaces freely. Figure 78 showcases the differing heights within the same space. This is to emphasize the idea of "low-floors and high ceilings." By allowing there to be multiple different ceiling heights, this can create a more dynamic space that is visually appealing. It can also make the same space feel different when walking under a different ceiling height.



Figure 76: Library Entrance



Figure 77: Library Multipurpose

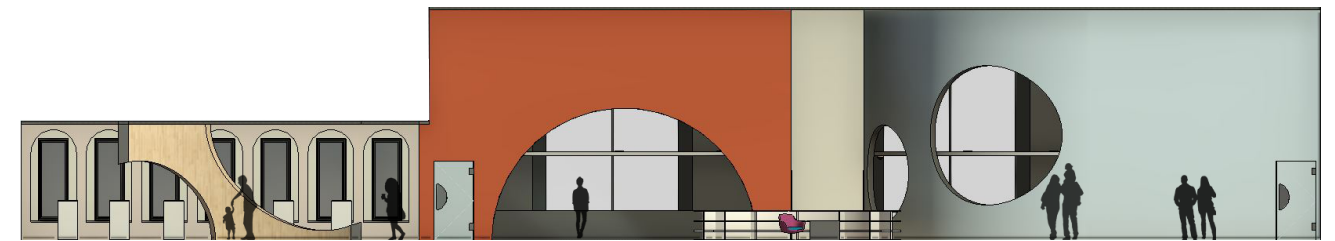


Figure 78: Third Floor Elevation NTS



Figure 79: Third Floor Mezzanine Elevation NTS

The library also features a more open lounge space in comparison to the guarded reading areas of the circular bookshelves (figure 80). This area is designed to encourage socialization and collaboration among peers. It features reading stalls, a bar and open seating. It is also adjacent to the third-floor outdoor patio.

Finally, the library is split into three levels, the main floor, the first mezzanine which sits on top of the third-floor washrooms, and the second mezzanine located just above the first. The mezzanine is connected to the third-floor through the first mezzanine and a climbing wall (figure 82). Visitors can freely use the rock-climbing wall during supervised hours. The mezzanine features tree-like bookshelves with soft-seating near the base of the “trunk” (figure 81).



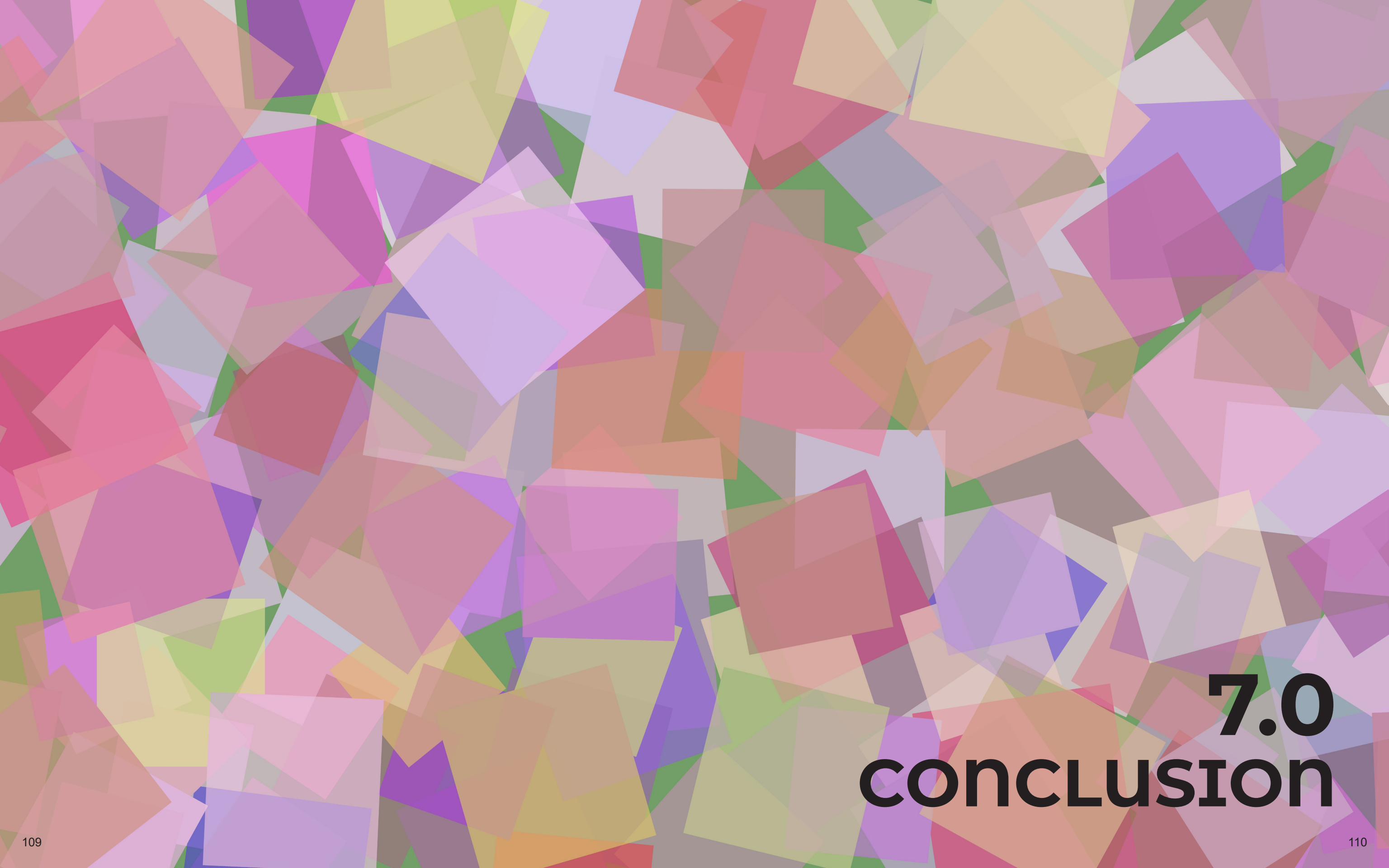
Figure 80: Library Lounge



Figure 81: Mezzanine Overlook



Figure 82: Third Floor Library



7.0 **conclusion**

7.0 Conclusion

7.1 Conclusion

This practicum study was created with a passion to make things more fun. Traditionally, the library has been a place to go to for extra learning, to borrow books that one may not otherwise want to purchase. However, within the library, especially academic libraries, there is not a lot of tolerance for noise. They are traditionally places of quiet study and calmness. This practicum project aimed to explore ways of enhancing how people learn at a library and improve the communities in which they are situated. Through research, a common factor was discovered among select educators and education methods: the idea of hands-on learning.

Additionally, from the research conducted for this practicum project, there are many people who learn best when learning by doing, for example, creating, testing, exploration, or lab driven projects. As seen in education systems around the world, primary schools are historically rooted in the traditional way of learning. This entailed students to study what is taught in lectures and to apply it to text-book based questions for test results. While this method is suited for many subjects and careers, it may not be suited to teach creativity and imagination within young adults.

This practicum looked at the history of the library and the world and discovered that society is ever-evolving and constantly creating new technologies. These new technologies may advance the world into the next era, making peoples' lives easier and expanding upon what has already been invented. We are in an age of innovation and the traditional method of teaching may not be best suited to prepare the next generation of students for an ever-evolving world

Thus, the exploration of designing a space that is historically rooted in traditional teaching, such as the library, and enhancing it through the application of theories on play to encourage and nurture imagination and creativity is important. Play was chosen as the main driving force behind this practicum, as most people enjoy themselves the most when they are playing. While playing, people become more creative, more imaginative, and are willing to spend more time and effort on something that they are passionate about. With this, the research looked at how a space can become more playful. This is where playscapes and makerspaces were explored, as they are spaces where people can freely create, collaborate, and imagine what may be possible.

Overall, from this research into the theory of play, the idea of makerspaces, and third places, the practicum was able to create and design a theoretical learning resource center. It is a place that combines the research and learning capabilities of a traditional library with the playfulness of playscapes to make learning more fun for a variety of people. This learning resource center enables one to learn new skills, collaborate and share their ideas to improve them, and finally, prototype, test, and create their ideas into a physical object or tangible results. It is a place where an individual can go to play and have fun, to learn, and to relax all at the same time. It is also a place where a person can go through the creative learning spiral, and maybe innovate ways to improve their communities.

7.2 Revisiting Questions of Inquiry

Question 1: *What Interior design strategies can potentially enhance the current public library typology and support the integration of learning/production spaces?*

There are many interior design strategies that can be used to enhance the current public library typology and support the integration of learning and production spaces. This project focused on theories and strategies that helped to encourage the idea of play within each space. By doing so, the spaces became activated and fun. As shown in the literature analysis, this practicum focused on five key subjects, creativity, and learning, the playscape, the maker movement, interactive environments, and traditional to modern methods. From the subject of creativity and learning, the theories of the Learning Spiral and the Four P's of Creative Learning as described by Mitchel Resnick were used to create a framework for design and design objectives. This meant that the spaces had to be designed in a way that would be able to host, encourage, and nurture a wide array of experimentation, projects, and activities. It had to be flexible and cater to many subjects of interest as not everyone shares the same passions, have wide open spaces that are welcoming and encourage peers to collaborate and meet each other, and finally, be a place where play can occur virtually anywhere.

The theories of Tooke, and Shackell et al, on the design of playscapes and the types of play, helped to programme the building according to each space's unique characteristics and activity. The research stated that the spaces shouldn't enforce play but rather encourage users to act freely without constrictions. Thus, each space was programmed and categorized based on the type of play it could support, and then placed accordingly in a way that the visitor could experience a different type of play within each space.

The theory behind the makerspace movement and the strategies of HOMAGO and the wet, dry and dusty methods helped to inform what types of maker spaces were needed, such as design hubs and shops of varying activities.

Within the subject of interactive environments, Oosterhuis and Bioria discussed theories that would encourage users to interact with the building. One such theory was the theory of customization, stating that each space should lean away from the use of mass-produced items and aim to have custom pieces of furniture, equipment, millwork, objects, etc. to make the spaces unique and engaging. Pairing the theory of customization with the ideas researched in the subject of traditional to modern and designing playscapes, each space was designed with a unique custom object that encourages play or collaboration in some form.

In addition, by utilizing the basic principles of interior design, which are harmony, rhythm, proportion, scale, contrast, details and balance, a unique design can be created. Within the theory of "low floors and high ceilings," the strategies of contrast and scale enabled the design to have multiple spaces of varying sizes within the same floor. This creates a contrast of spaces and allows for visual intrigue as someone goes through the building. By using the strategies of rhythm, balance and harmony, the design can incorporate a typology of makerspaces and playscapes and blend them to enhance each others' programmes. Thus, the incorporation of these typologies can potentially enhance the current library topology.

Question2: *How can interior design be used to make the public library more appealing and attract more end-users?*

Through the research and literature analysis, many types of interior design theories and practices were used to enhance the interior environment of the space. In the precedent study, different types of libraries and educational institutes were able to enhance their own typologies and encourage the idea of play. For example, the Fuji Kindergarten, designed by Tezuka Architects, was able to promote education and collaboration by allowing kids to run around and play. They created a space with virtually no boundaries within the interior, allowing kids to interact with each other and other classrooms. By including many different typologies, the Helsinki Central Library was able to attract more users and visitors as it catered to many different uses. It was a social hub, educational institute, workshop, theatre, and café in one single building. By utilizing space planning strategies, the spaces worked together and enhanced the building's typology.

Similarly, this practicum project utilizes some of the practices seen in the precedent studies to enhance the public library typology. For example, the project utilizes open workspaces and minimal partitions to separate spaces. This allows users to freely collaborate and mingle. It also utilizes interior design strategies that allow the incorporation of more spaces and typologies that are not typically found in libraries. By allowing for more spaces and functions, the building should successfully be able to attract more end-users by becoming more than a library for reading and borrowing books.

In addition, the design incorporated spaces that cater to different types of play, such as functional play, game play, dramatic play, and constructive play. The space planning of the building allows for a different type of play to be experienced as a visitor navigates from one space to the next. By creating unique experiences through the interior design of each space and typology, the project can offer something new to its visitors while also enhancing the community it is situated in.

Question 3: *How will the theoretical implementation of different space typologies within a public library model affect the intended users and how they interact with the interior spaces?*

This practicum project implemented and incorporated different space typologies within the typology of a public library. For instance, spaces classified as social hubs, makerspaces, and learning spaces were incorporated into this project. In doing so, it allowed the building to utilize the theories of the Creative Learning Spiral and the framework of the Four Ps of Creative Learning as defined by Mitchel Resnick. To apply these theories, the practicum project has spaces like a design hub and a library where people can imagine new projects and spaces that allow users to create, and experiment/play with their creations. Secondly, the social hubs allow users to share their ideas and creations and collaborate. Thirdly, there are study areas which allow for self reflection. The process of the Creative Learning Spiral can be followed throughout these spaces. Additionally, by incorporating many space typologies, the project encourages its users to utilize each space the building provides.

The incorporation of different space typologies allowed for the opportunity to design different custom objects within each space that encouraged a form of play or collaboration in a different way. This changes how the visitor may interact with the interior space and encourages users to interact with others more. The hill-like seating found throughout the second floor encourages users to climb, stand, and sit on the seating in unique ways, encouraging play within the space.

The reading stairs act as a unique opportunity for a gathering space. The coffee bar, which mimics a tree, presents the unique design trait of biophilic design used to attract visitors and bring elements of the natural outdoor environment to an interior environment.

The multipurpose area is designed to be open and seamless within its surrounding space, allowing for unique learning opportunities while remaining open and inviting. People can use the wall itself as a place to sit or enter from. The circular bookshelves of the library create unique semi-enclosed areas for reading and gathering while also allowing for the use of technological advances such as the RFID tagging system mentioned by Dijkstra and Hilgefort, which allows the book to exist on any shelf or any space within the building. By including custom elements that enhance each typologies unique activity while also encouraging play throughout the building, it will affect how users view and interact with the building.

Question 4: *How can the theory of play be integrated into the interior environments meant for learning and enhance the built environment?*

The theory of play was incorporated into the interior environments in many ways. First, it classified the function of each space into a type of play: functional, games, dramatic and constructive. By doing this, each space can now be appropriately designed in a way that encourages that type of play within that space. For example, in constructive play, creation and making of objects should be encouraged. Therefore, the space needed to be designed in a way that allows for the use of tools and complex machines. In functional play, physical activity such as running and jumping are encouraged. Thus, the design of elements such as moveable furniture, climbable bookshelves, a rock-climbing wall, or seating areas that could be rearranged freely were implemented into the design. By designing in this way, the library, which is a place meant for learning, can also encourage its users to play and have fun while reading.

7.3 Reflection/Future Considerations

While there are many ideas and theories relating to play, due to time and building space constraints, not all ideas and theories were incorporated into the design. The current design is only able to apply a few theories and ideals of play. While all typologies that were explored in the research were able to be designed and implemented within the building, they unfortunately still read as separate programmes. A wholistic approach to the space planning may have been more optimal, allowing the different typologies to mix and compliment each other better. For example, workshops could be a part of the library, or a café could be part of the workshops.

As a result of the current design, visitors are forced to go through the makerspaces to get to the café or exhibition area, and then through the social spaces to reach the library spaces. A more interesting design may have resulted if a wholistic approach was considered. The project could have also benefited from the exploration and incorporation of more advanced technologies and systems. These technologies could make it easier to interact with the building, find information, or make it more accessible.

This project also did not take into consideration the safety and security of the spaces. As this project was designed as an open public space, anyone could walk in, even potentially dangerous people. If this project were to be improved upon, security would be a major factor to consider as it concerns the safety and well-being of not only its users but also the surrounding community it resides in.

Additionally, the chosen building may have inhibited the application of the researched theories. While the research advocated for large amounts of floor space required for a larger programme, it also suggested the idea of spaces requiring varying heights to accommodate many types of activities and projects. Thus, the original building chosen for this project required an addition to its architectural design. However, this design had to compliment the original building without altering it too much, which limited how big of an addition could be made to the building. As a future consideration, a complete new building design would be more beneficial to the programme that is being proposed.

Regarding next steps, a more detailed exploration of the design could be taken. The design was successful in implementing many custom elements to allow and encourage play to happen within each space of the project. However, collaboration with other experts and trades such as electricians, engineers, artists, etc. could elevate this project further.



APPENDIX

Appendix A: References/ Bibliography

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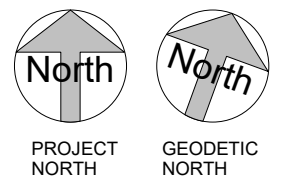
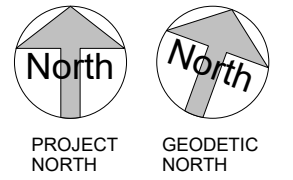
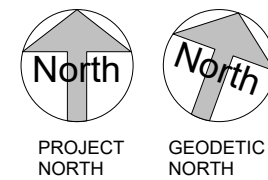
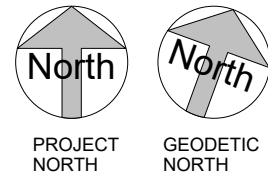
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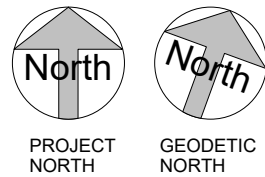
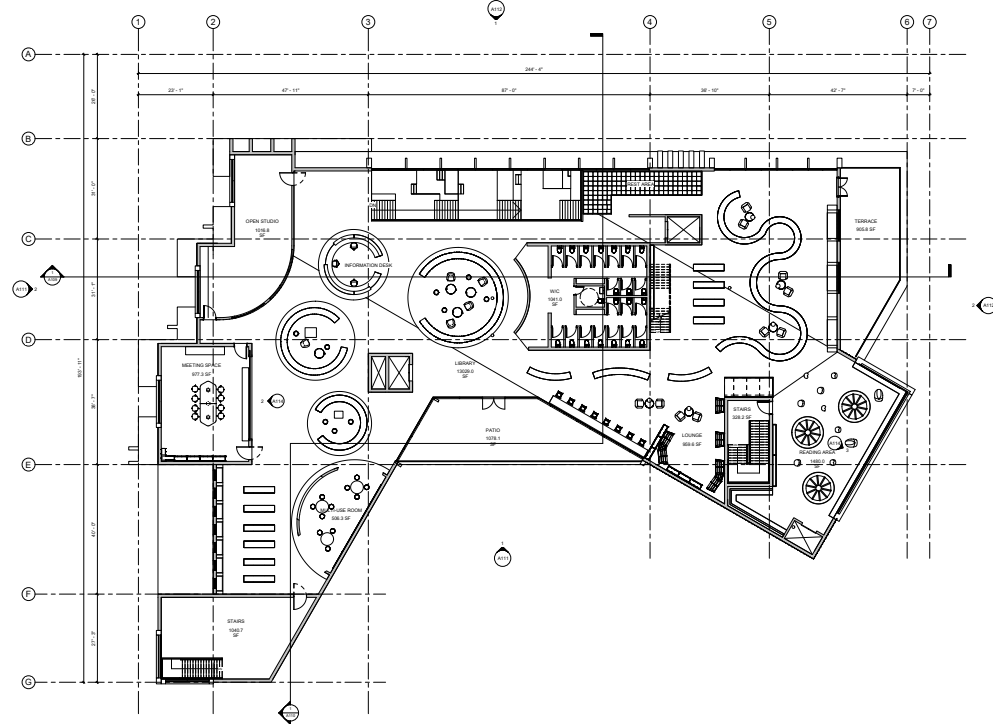
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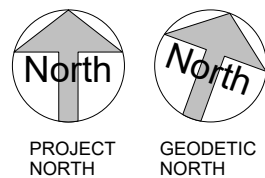
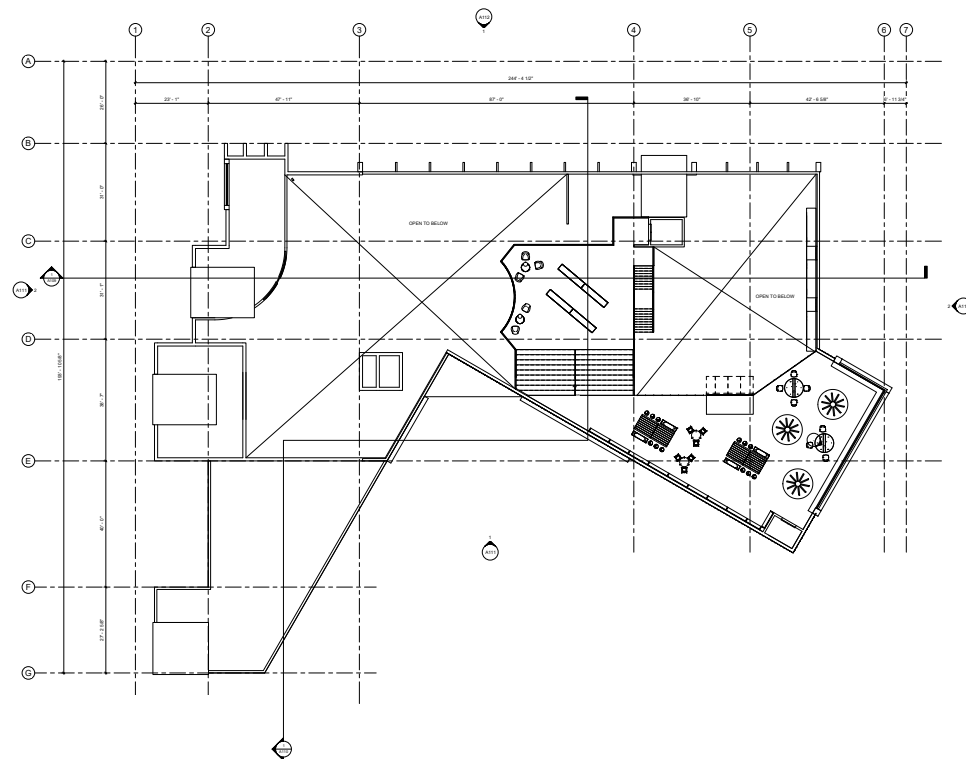
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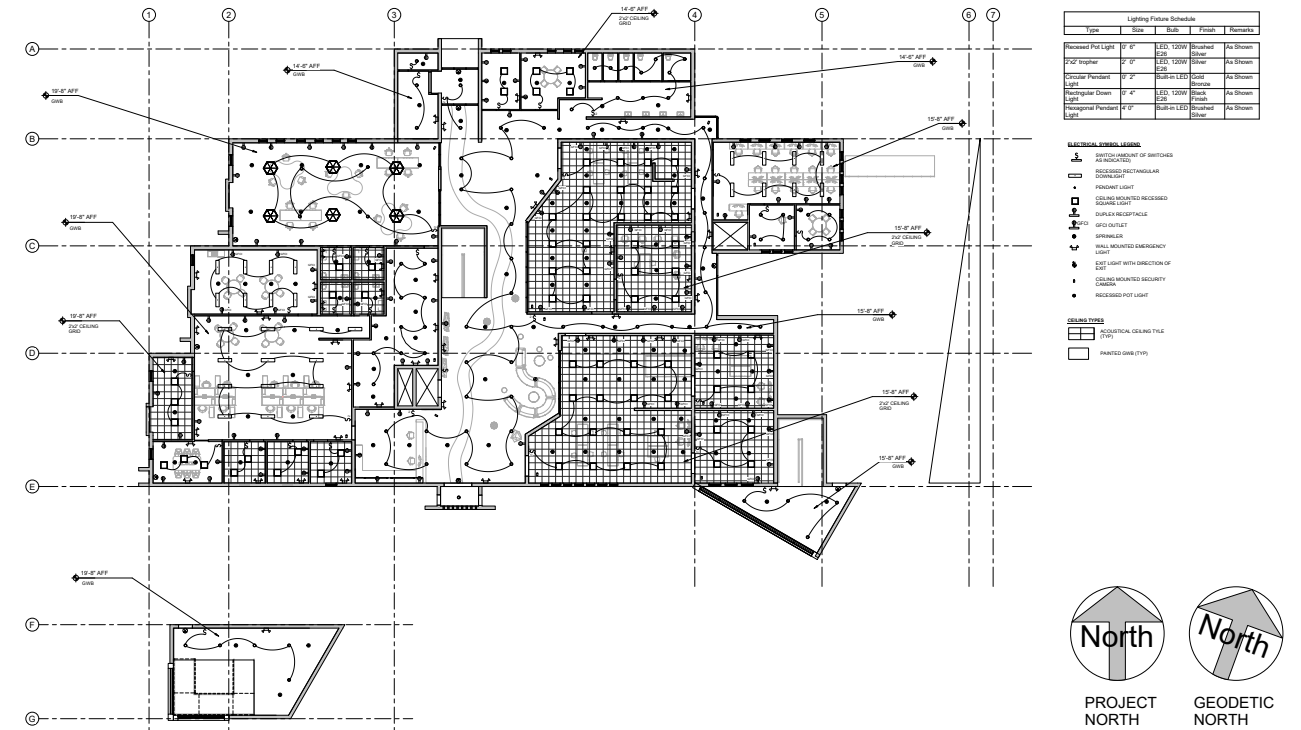




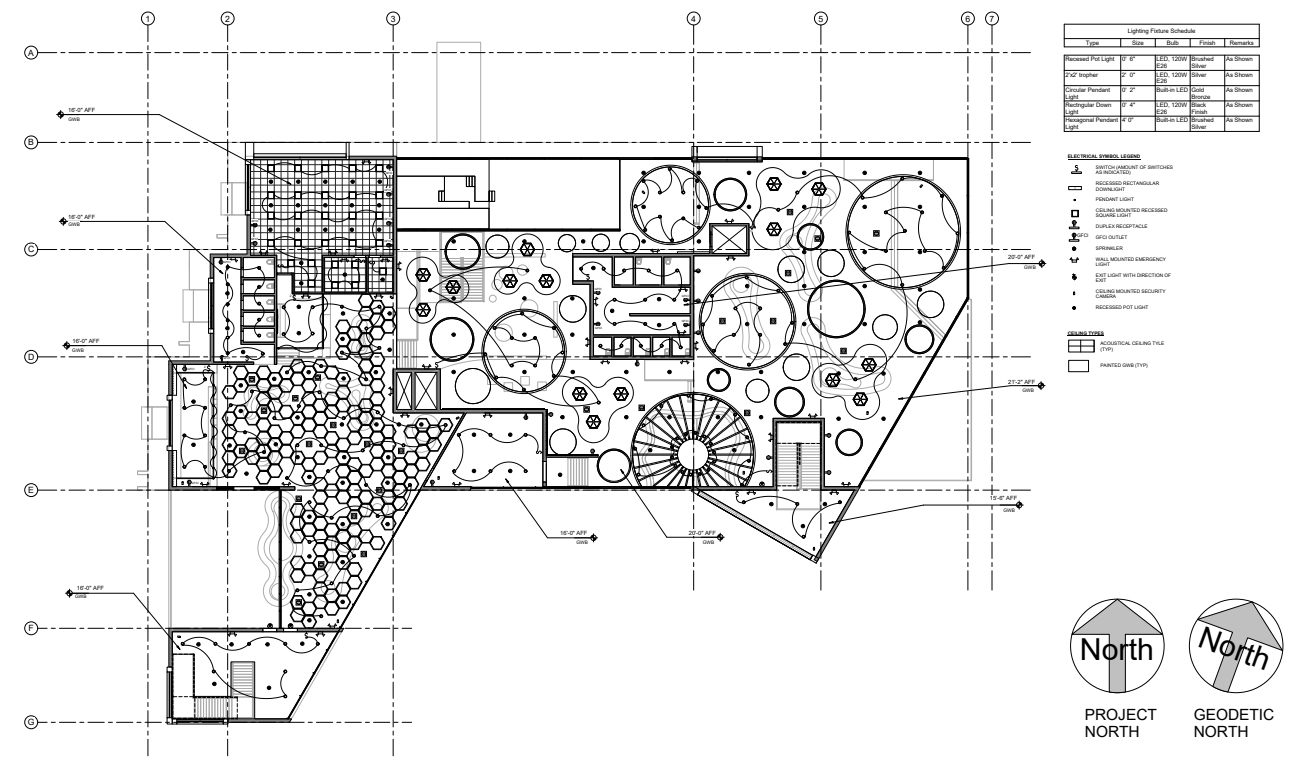
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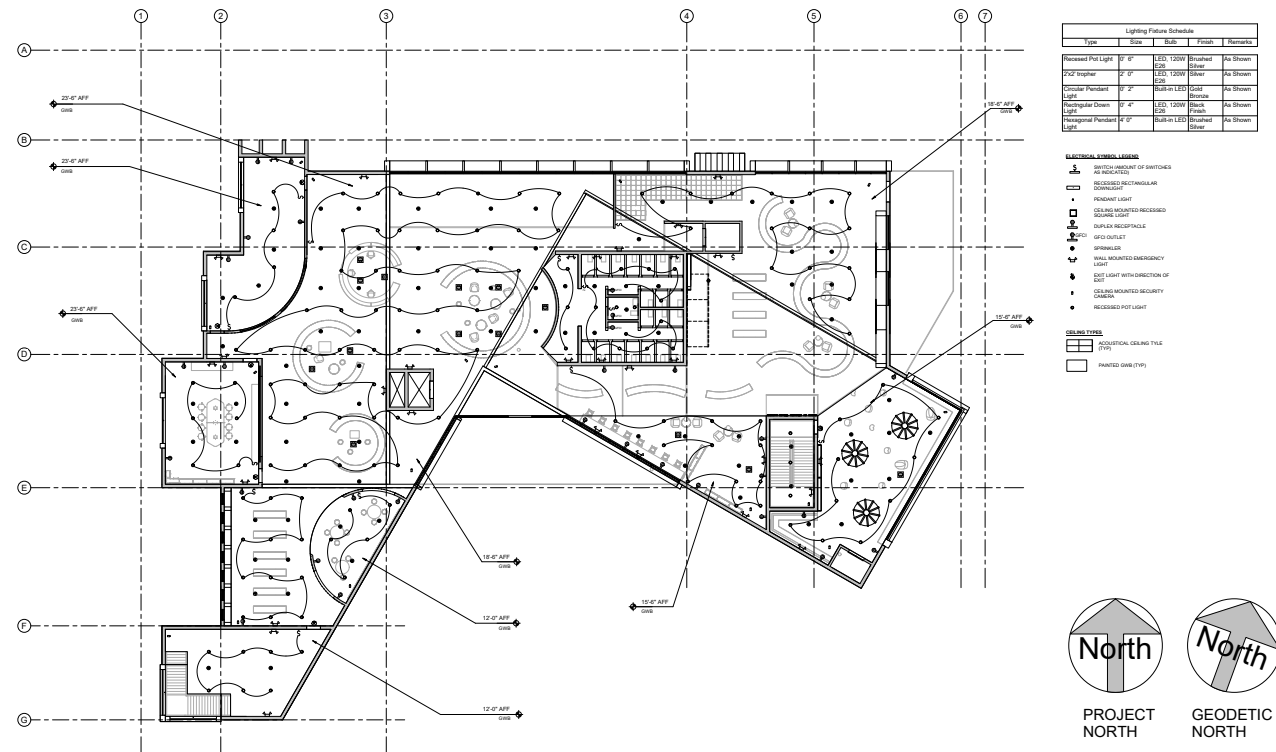
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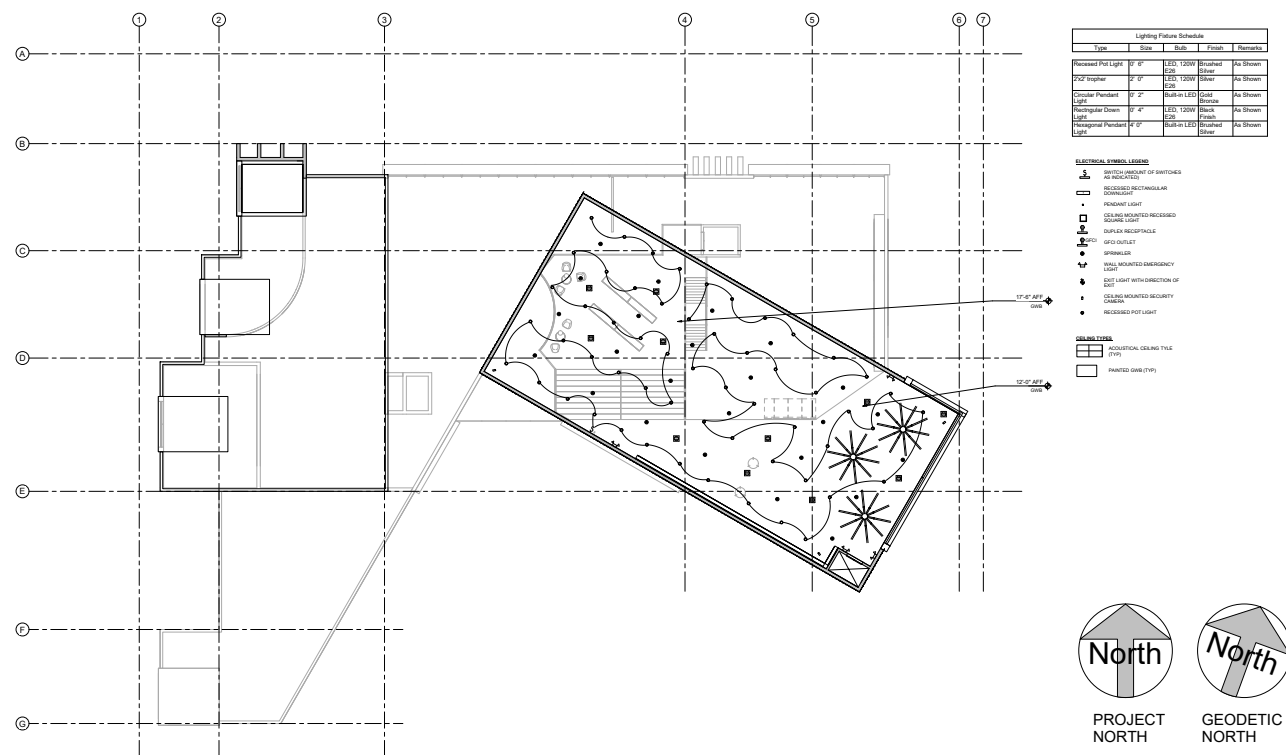
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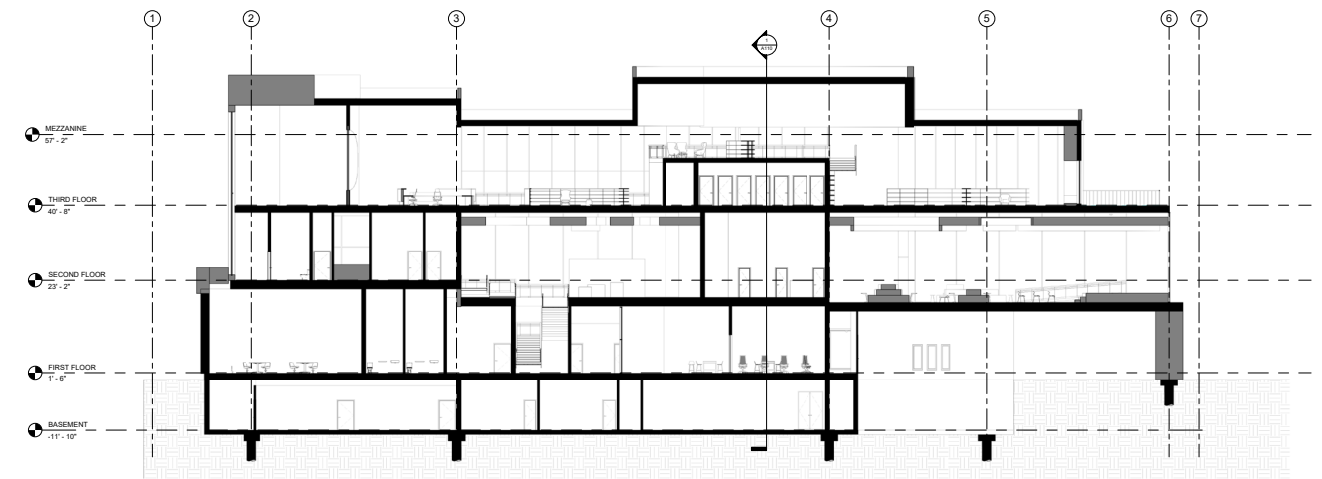
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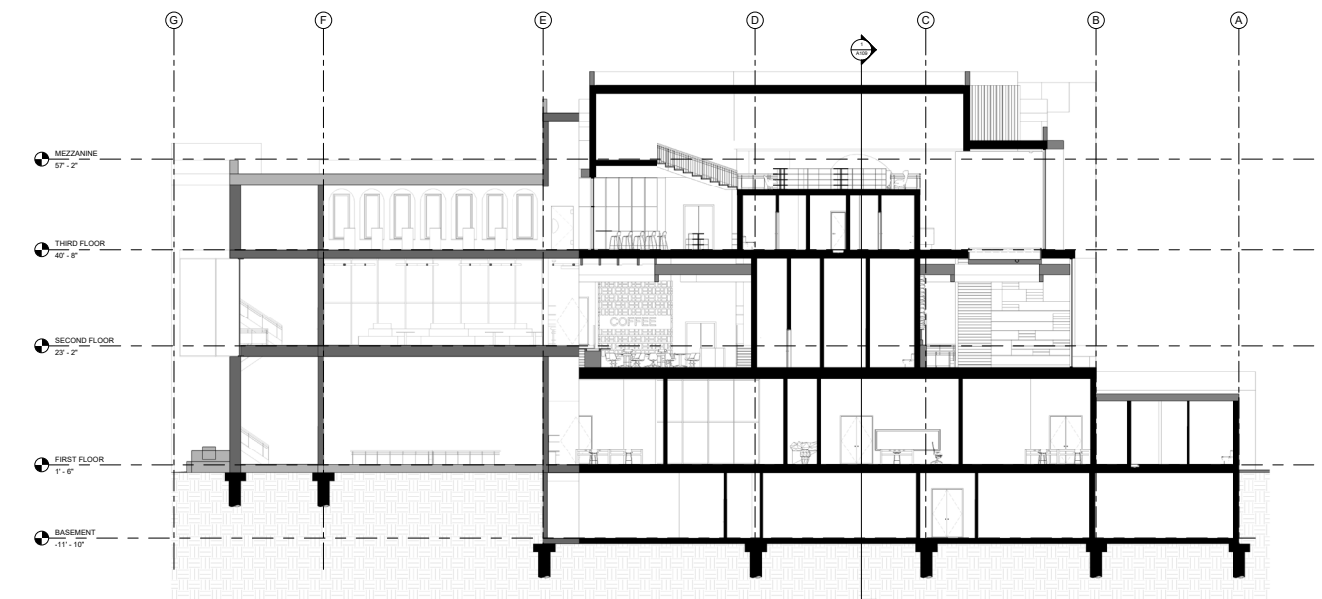
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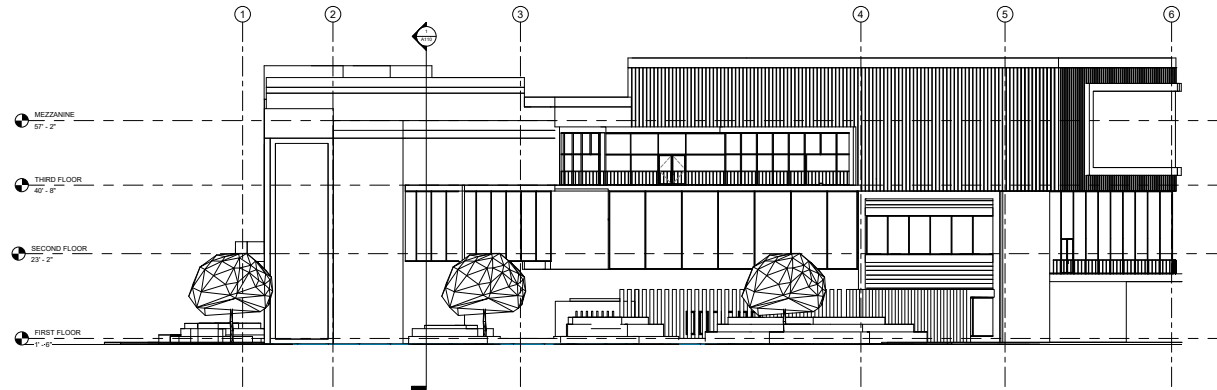
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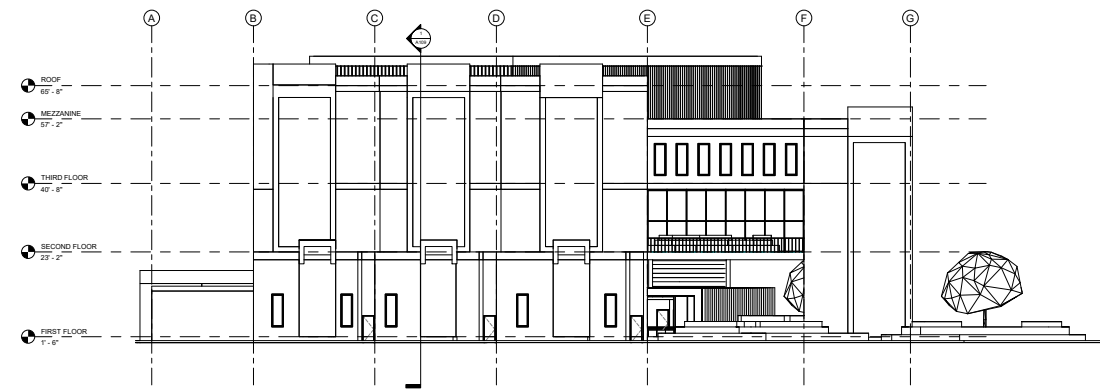
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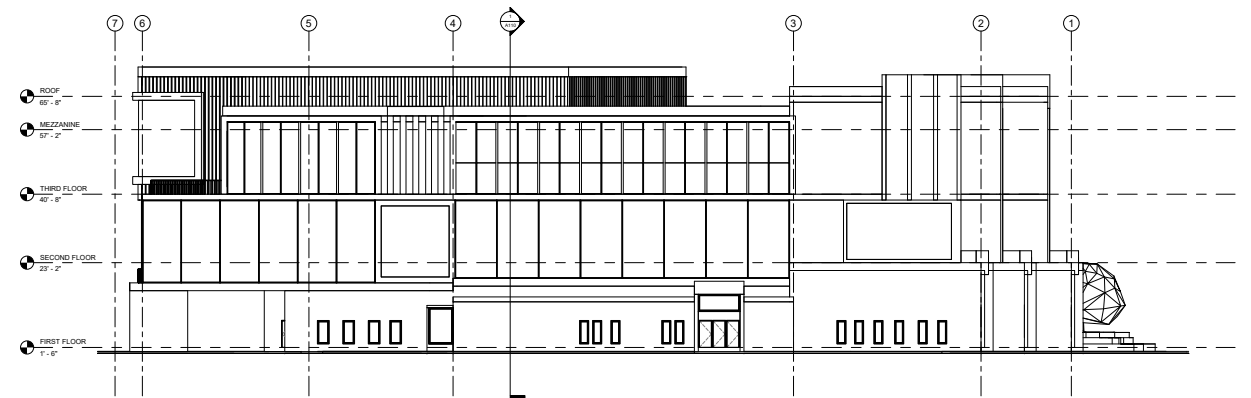
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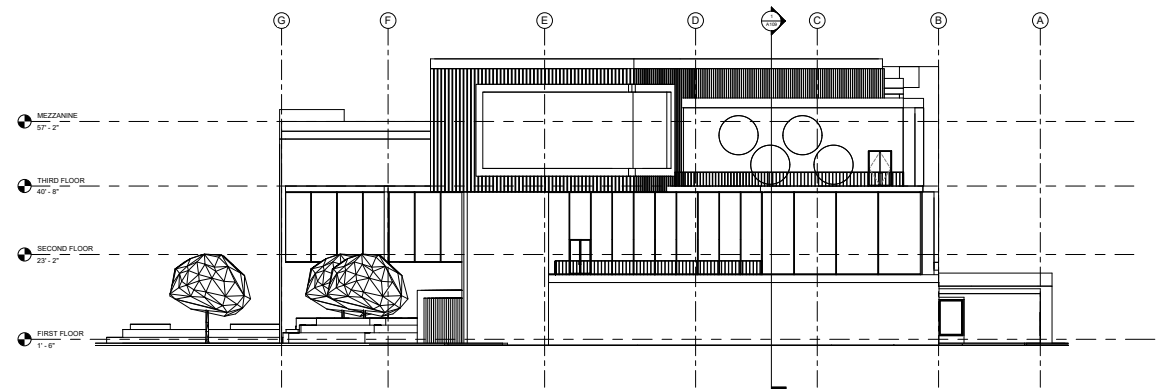
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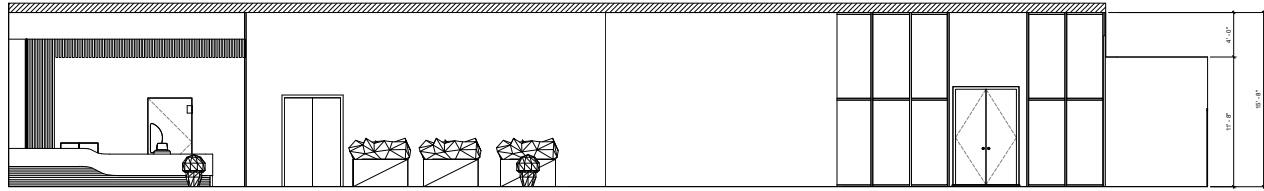
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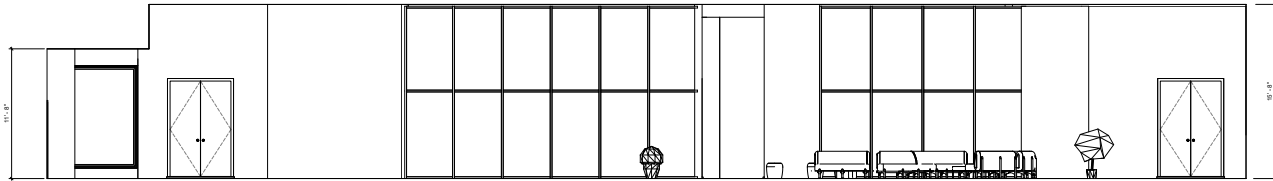
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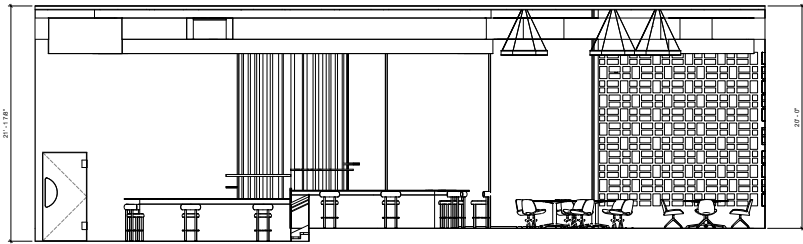
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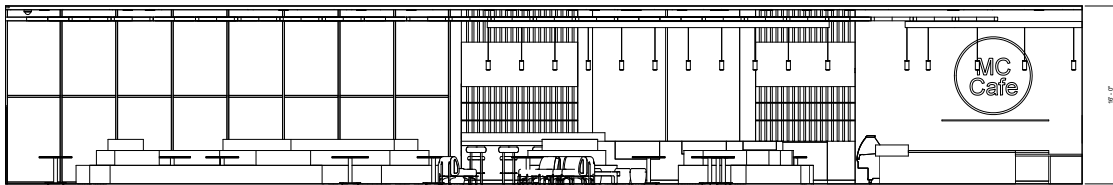
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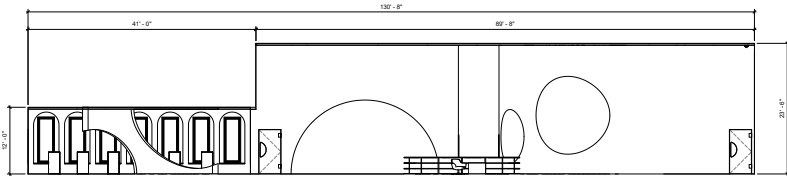
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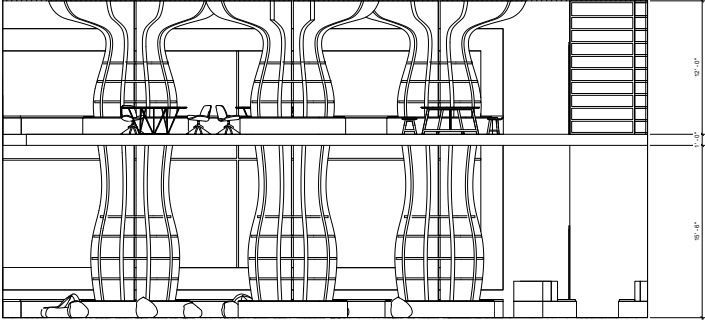
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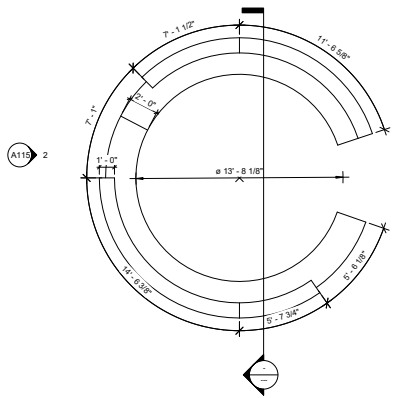
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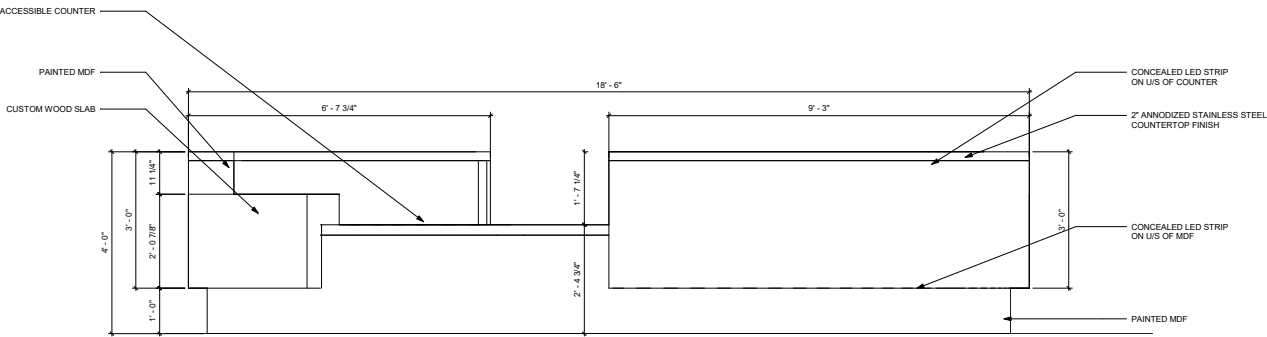
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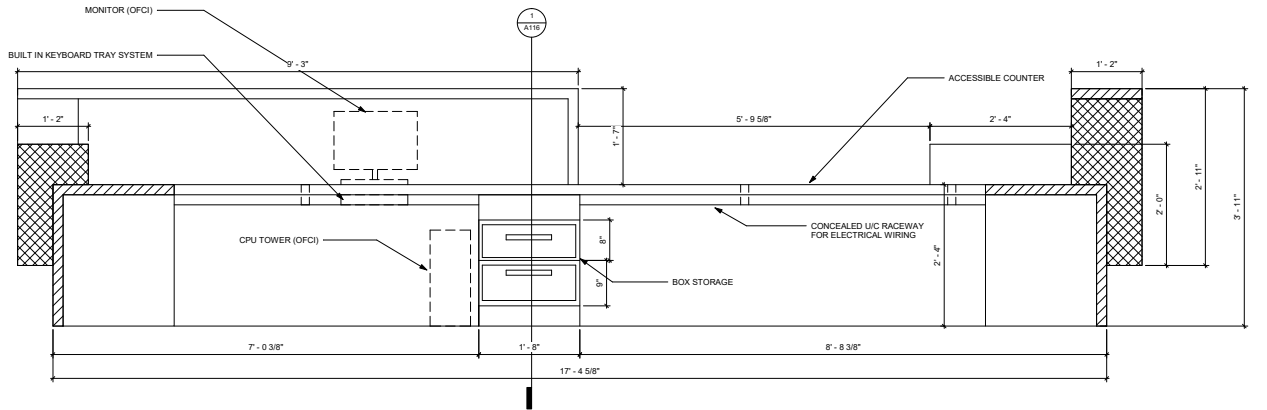
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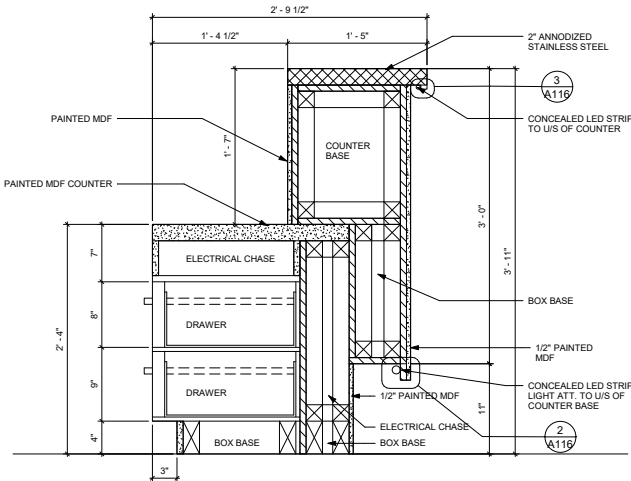
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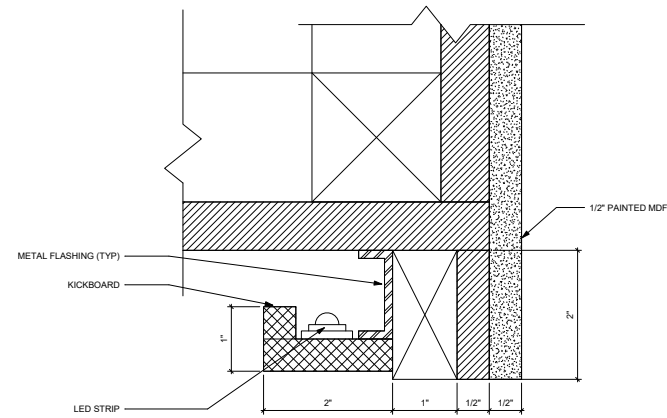
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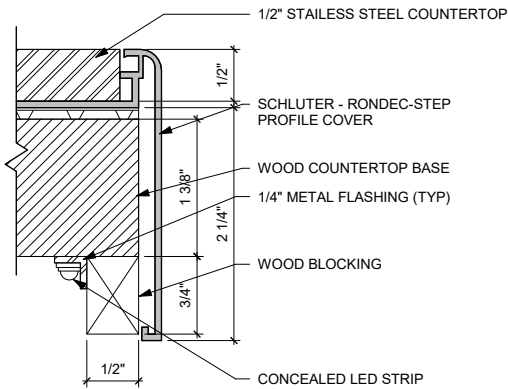
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SECTION THROUGH DESK
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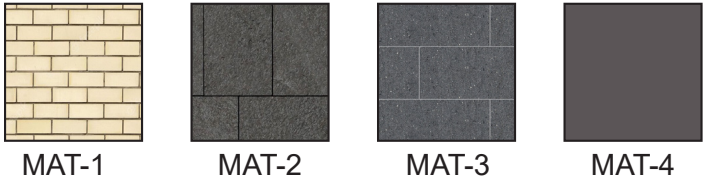
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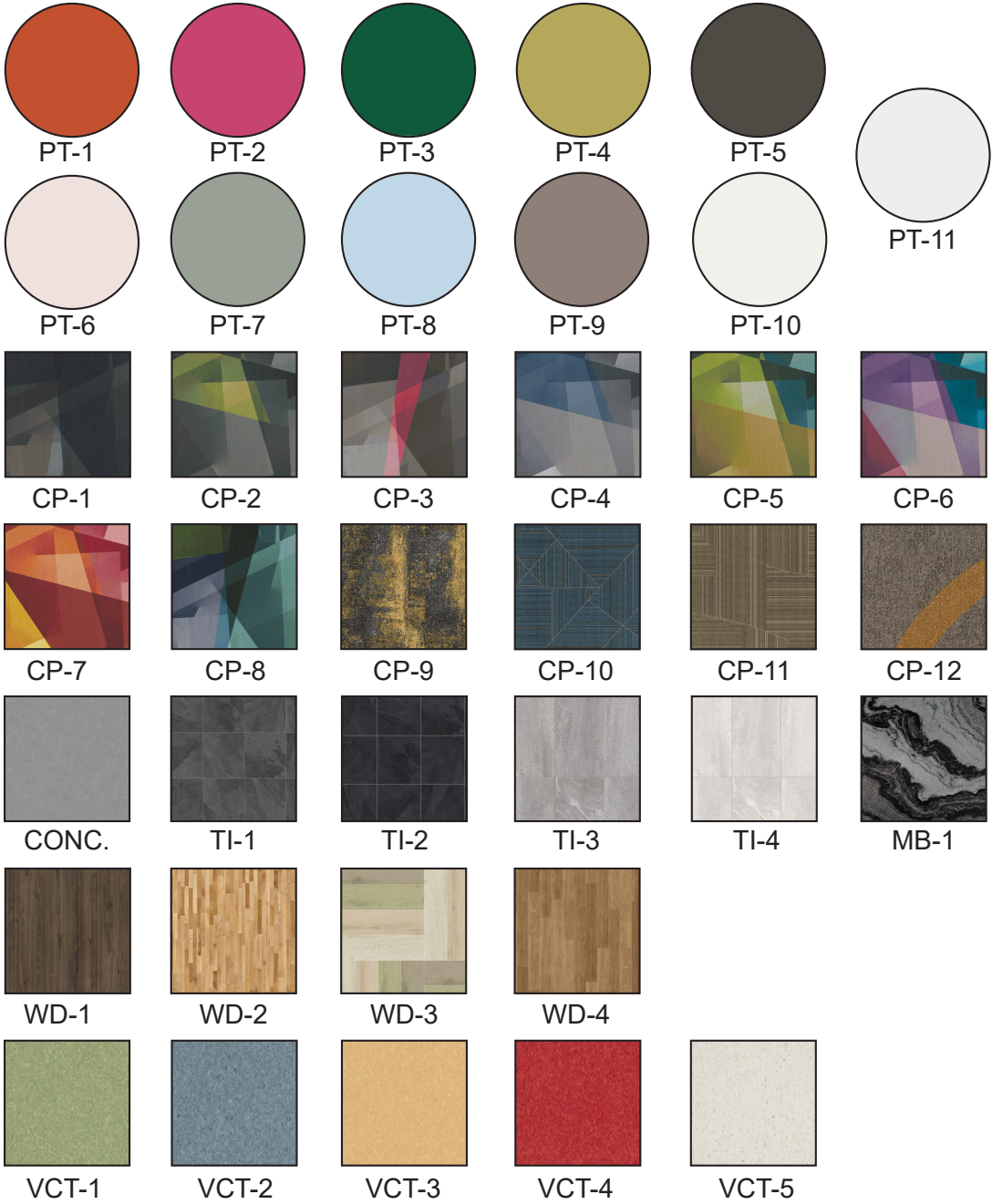
COUNTERTOP DETAIL
NTS

Appendix C: Finishes and Materials

Exterior Materials and Finishes



Interior Materials and Finishes



Materials Legend

- MAT-1: Beige Tyndall Stone Brick
- MAT-2: Dark Grey Basalt Stone Exterior Brick
- MAT-3: Light Grey Basalt Stone Exterior Brick
- MAT-4: Dark Grey Exterior Grade Steel Cladding
- PT-1: Benjamin Moore Paint – Fireball Orange: 2170-10
- PT-2: Benjamin Moore Paint – Peony: 2079-30
- PT-3: Benjamin Moore Paint – Rainforest Foliage: 2040-10
- PT-4: Benjamin Moore Paint – Wasabi: AF-430
- PT-5: Benjamin Moore Paint – Midsummer Night: 2134-20
- PT-6: Benjamin Moore Paint – First Light: 2102-70
- PT-7: Benjamin Moore Paint – Heather Gray: 2139-40
- PT-8: Benjamin Moore Paint – Jet Stream: 814
- PT-9: Benjamin Moore Paint – Smoked Oyster: 2109-40
- PT-10: Benjamin Moore Paint – White Heron: OC-57
- PT-11: Benjamin Moore Paint – White Diamond: OC-61
- CP-1: Milliken Carpet Tile Edge Lit Collection – Mercury: EDG107-133
- CP-2: Milliken Carpet Tile Edge Lit Collection – Incandescent: EDG118-141
- CP-3: Milliken Carpet Tile Edge Lit Collection – Fluorescent: EDG120-168
- CP-4: Milliken Carpet Tile Edge Lit Collection – Black Light: EDG133-229
- CP-5: Milliken Carpet Tile Edge Lit Collection – Atmosphere: EDG141-201-65
- CP-6: Milliken Carpet Tile Edge Lit Collection – Aurora: EDG229-148-232
- CP-7: Milliken Carpet Tile Edge Lit Collection – Infrared: EDG231-60-168
- CP-8: Milliken Carpet Tile Edge Lit Collection – Nebula: EDG249-202-198
- CP-9: Milliken Carpet Tile Comfortable Concrete Collection – Cool Flame: URP12-118
- CP-10: Milliken Carpet Tile Remix Remastered Collection – French Blue: BKB126
- CP-11: Milliken Carpet Tile Remix Remastered Collection – Reverb: BKB42
- CP-12: Milliken Carpet Tile The O Collection – Sepia with Orange: CRB189-259
- CONC.: Finished Concrete Floor
- TI-1: Dark Grey Basalt Stone Tile
- TI-2: Black Basalt Stone Tile
- TI-3: Grey Porcelain Stone Tile
- TI-4: White Porcelain Stone Tile
- MB-1: Black Marble Flooring
- WD-1: Chestnut Fine Wood Grain Finish

- WD-2: Maple Fine Wood Grain Finish
- WD-3: Parquet Mixed Color Wood Floor Finish
- WD-4: Oak Fine Wood Grain Finish
- VCT-1: Armstrong Vinyl Composition Tile – Little Green Apple: 5C866
- VCT-2: Armstrong Vinyl Composition Tile – Mid Grayed Blue: 5C875
- VCT-3: Armstrong Vinyl Composition Tile – Golden: 5C878
- VCT-4: Armstrong Vinyl Composition Tile – Maraschino: 5C880
- VCT-5: Armstrong Vinyl Composition Tile – Cool White: 5C899

Floor Finish Plans



Figure 83: First Floor Rendered Plan NTS



Figure 84: Second Floor Rendered Plan NTS

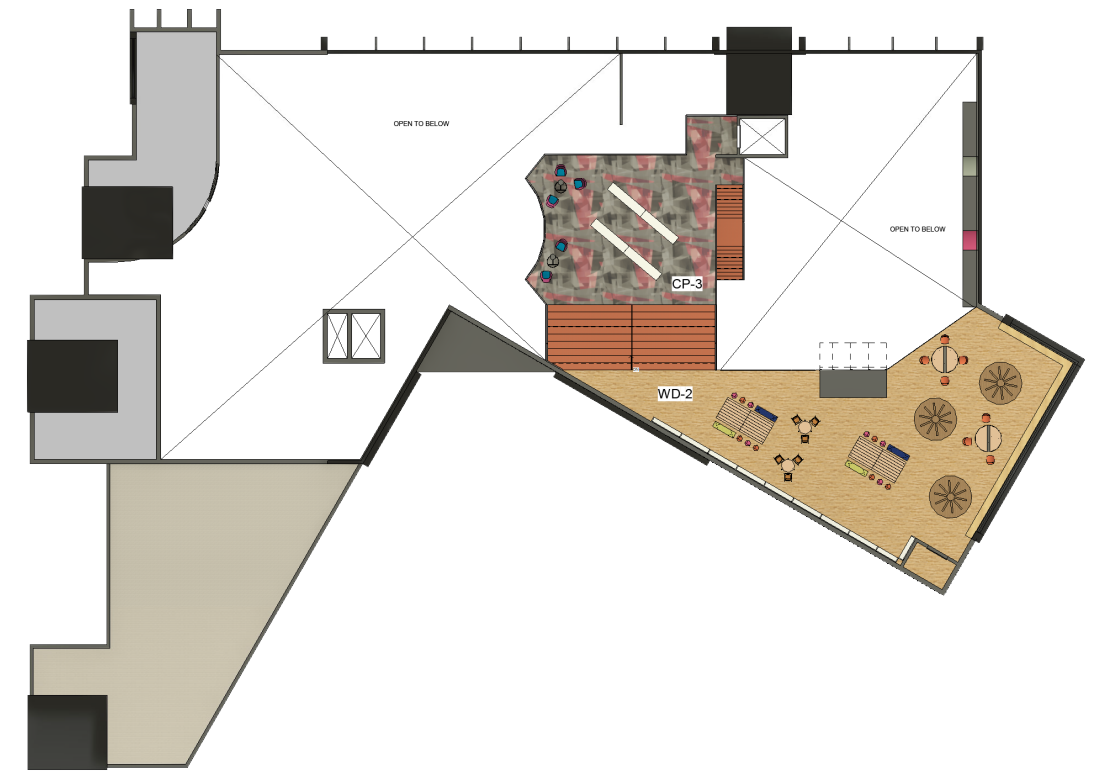


Figure 86: Mezzanine Rendered Plan NTS

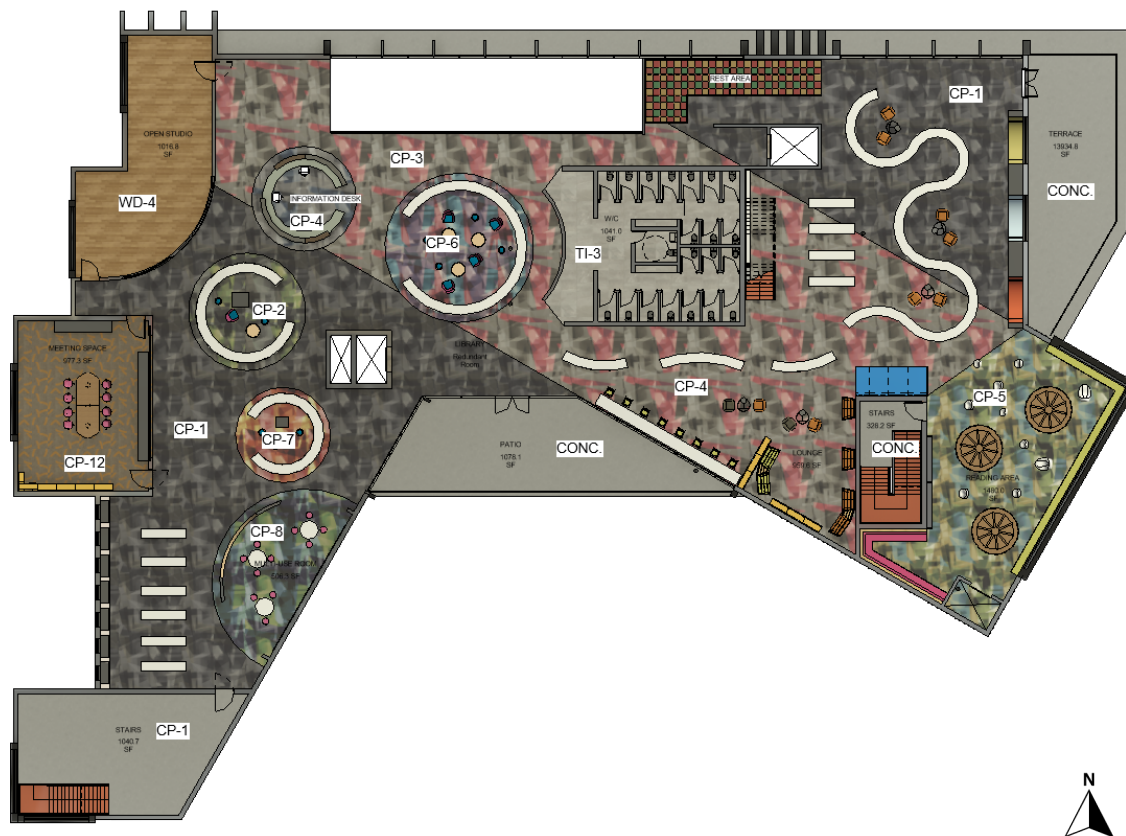


Figure 85: Third Floor Rendered Plan NTS

Appendix D: Sustainability

LEED®:

The LEED® rating system was considered as a part of the sustainability initiative part of this practicum project. It is to be integrated and into the construction of the additions and renovation of the interior environments of the project. It is to be used as an integrated process to aid in the implementation of the sustainable design standards and green building elements. By integrating and utilizing sustainable design strategies, the project aims to meet the LEED® v4 rating system as specified by the Canada Green Building Council, to achieve specific goals. The project aims in theory to be highly energy efficient, cost-effective, and eco-friendly through self-sustainment.

Project Related Sustainable Design Features and Strategies:

The following is a chart of specific design strategies that will be used in the design implementation of this practicum project.

Water Efficiency	The project aims to reduce its indoor water usage. This is achieved by specifying high efficiency water closets and lavatories with the objective to lower indoor water usage by a minimum of 20%. This will also aid in lowering the projects operational costs and its environmental life cycle cost at the same time.
Energy and Atmosphere	The project will aim to optimize on its energy performance systems using specific strategies. As an example of a strategy that can bused to reduce energy consumption is to reduce the amount of energy used by light fixtures. By specifying low watt LED luminaires to be used within the fixtures, the project can see the reduction of lighting energy consumption. This can also improve the projects maintenance costs as the operational lifetime of an LED bulb is longer than other types of bulbs. By also utilizing technologies such as occupancy sensors the energy consumption can be lowered even further as the lights will only work if someone is using that specific space.

Materials and Resources	The project will actively encourage the reduction of waste material and products. To achieve this the project will provide dedicated areas for the collection and storage of recyclable materials, and it will take proper measures for the safe collection, storage, and disposal of electronic waste materials. The project will also encourage the reuse, recycle or salvage of waste generated from construction materials wherever possible. This is to divert as much waste as possible away from landfills and incineration facilities. The project will also aim to source most of its construction materials from local vendors and sustainable practices. For example the project can source local materials such as Tyndall stone or the use of reclaimed wood over time.
Indoor Environmental Quality	The project will aim to improve the indoor air quality as much as possible for the comfort and well-being of the building occupants. To do this the project will use the minimum standards for indoor air and thermal quality. To do this some strategies that can be implemented is the use of low-emitting materials, the specification of efficient mechanical systems to filter indoor air, and the designation of smoking zones away from the building. The project will also aim to provide quality thermal comfort by utilizing natural and mechanical methods of heating. The project will also provide ample opportunities for the use of daylight while at the same time providing quality views for building occupants

These are just a few theories and strategies that can be used towards the sustainability of the project. Figure 86 shows the LEED® v4 for ID+C: Commercial Interiors checklist and how it can be applied to this specific practicum project.

Y	?	N
2		

36	0	0	Location and Transportation		18
18			Credit	LEED for Neighborhood Development Location	18
8			Credit	Surrounding Density and Diverse Uses	8
7			Credit	Access to Quality Transit	7
1			Credit	Bicycle Facilities	1
2			Credit	Reduced Parking Footprint	2

12	0	0	Water Efficiency		12
Y			Prereq	Indoor Water Use Reduction	Required
12			Credit	Indoor Water Use Reduction	12

33	2	3	Energy and Atmosphere		38
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Fundamental Refrigerant Management	Required
5			Credit	Enhanced Commissioning	5
25			Credit	Optimize Energy Performance	25
2			Credit	Advanced Energy Metering	2
		3	Credit	Renewable Energy Production	3
1			Credit	Enhanced Refrigerant Management	1
	2		Credit	Green Power and Carbon Offsets	2

13	0	0	Materials and Resources		13
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
1			Credit	Long-Term Commitment	1
4			Credit	Interiors Life-Cycle Impact Reduction	4
2			Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
2			Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
2			Credit	Building Product Disclosure and Optimization - Material Ingredients	2
2			Credit	Construction and Demolition Waste Management	2

Project Name:
Date:

17	0	0	Indoor Environmental Quality			17
Y			Prereq	Minimum Indoor Air Quality Performance	Required	
Y			Prereq	Environmental Tobacco Smoke Control	Required	
2			Credit	Enhanced Indoor Air Quality Strategies	2	
3			Credit	Low-Emitting Materials	3	
1			Credit	Construction Indoor Air Quality Management Plan	1	
2			Credit	Indoor Air Quality Assessment	2	
1			Credit	Thermal Comfort	1	
2			Credit	Interior Lighting	2	
3			Credit	Daylight	3	
1			Credit	Quality Views	1	
2			Credit	Acoustic Performance	2	

1	5	0	Innovation	6
	5		Credit Innovation	5
1			Credit LEED Accredited Professional	1

0	4	0	Regional Priority		4
	1		Credit	Regional Priority: Specific Credit	1
	1		Credit	Regional Priority: Specific Credit	1
	1		Credit	Regional Priority: Specific Credit	1
	1		Credit	Regional Priority: Specific Credit	1

114	11	3	TOTALS	Possible Points: 110
Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80+				

Appendix E: Building Code Review

A short building code analysis was conducted for this project. The following are the results. This building code analysis follows the National Building Code of Canada 2020, as the project is located in Manitoba which adheres and enforces the 2020 version.

Code Analysis:

Project MindCraft, March 2024

420 Corydon Avenue
Winnipeg, MB, CA.

ITEM	EXPLANATION	NBC Reference
General		
Project Description	3 Storey multipurpose building	
Major Occupancy	Group A – Division 2	3.1.2.1
Separation of Major Occupancies	2hr FRR of Fire Separating Construction	3.1.3.1
Occupant Load	Summary of Building: First Floor: 1,643 persons Second Floor: 2,189 persons Third Floor: 2,779 persons	3.1.17.1.
Building Area	6,882m2 (69,368 ft2)	
Building Fire Safety		
Number of Storeys	4 Storeys	3.2.1.1.
Height of Building	21.75m to top of roof	
Number of Streets	2 Streets	3.2.2.10
Permitted Construction	The building shall be of non-combustible construction	3.2.2.23.
Building Classifications	Group A, Division 2, Any Height, Any Area, Sprinklered	3.2.2.23.
Sprinkler System	Automatic Sprinkler System	3.2.2.23.
Required Fire Resistance Rating	Floor assemblies: shall be fire separations with 2hr FRR Mezzanines: 1hr FRR	3.2.2.23.
Spatial Separation	Between F-2 and A-2, a 2hr Fire separation assembly is required.	3.1.3.1.
Fire Alarm	Fire alarm is Required	3.2.4.1.
Water Service	Shall be provided with an adequate water supply for firefighting	3.2.5.7.
Standpipe	Standpipe System is Required	3.2.5.8.

Figure 87: LEED®v4 for ID+C: Commercial Interiors Checklist

ITEM	EXPLANATION	NBC Reference
Exits		
Minimum Number of Exits	Every Floor shall be served by at least 2 exits	3.4.2.1.
Fire Resistance Rating of Exit Separations	45min – 2hr FRR	3.4.4.1.
Health Requirements		
Water Closets (W/C)	Occupancy Group A2: 6,507 total persons 3,253 Males – 21 required, 42 provided. 3253 Females – 41 required, 42 provided. Occupancy Group F2: 104 total persons 52 Males – 2 required, 42 provided. 52 Females – 3 required 42 provided.	3.7.2.2.-A
Lavatories	24 lavatories required	3.7.2.3.

