



Stitch Together

Creating Ephemeral Architecture Through Crochet

Shams Al-Azzawe - 2025

Examiner: Jonas Lundberg | Supervisor: Mimmi Amini
Master thesis at Chalmers School of Architecture
Department of Architecture and Civil Engineering



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Abstract

Stitch Together explores the connections between ephemeral architecture and crocheting - how this craft can be used to create modular structures that are interactive for the user and revitalize in between spaces in the city.

Ephemeral architecture challenges the permanence of architecture, redefining the urban space by its temporary and flexible nature (Borges Ferreira, 2024). The structures are adaptable to new contexts, meant to be assembled and disassembled (ArchDaily, 2023) and liven up the urban environment by having a function that is interactive for the user (Borges Ferreira, 2024). This is especially relevant for in between spaces in the urban context that often lack activity and interaction.

In architecture, crocheting offers a seamless creation of 3D objects that are lightweight, flexible, and resilient. It also creates a tactile, soft and inviting materiality to touch (Baurmann, n.d.). Due to the crocheted fabric's flexible nature, ability to create forms freely and many options for stitches, it is an interesting technique for applying ephemeral architecture. Its lightness makes it easy to move from place to place and its flexibility makes it easy to assemble and disassemble.

The thesis translates the material properties and techniques within crocheting into architectural practice. It uncovers the range of the crocheting techniques, that are diverse and can create tensile structures effortlessly. Additionally, crochet chart patterns have been explored as a tool for modularity, illustrating the structure of the crochet pieces.

The thesis begins with explorations about crochet stitches, techniques, and the chart language in relation to architecture and how it could be applied to different functions on the site, Esperantoplatsen. These functions, or as I call them architectural uses, are defined by a site analysis. These include climbing, enclosing, sitting and viewing. The uses were then analyzed in relation to the crocheting techniques to conclude different compatibilities. From this, the design proposal was developed, consisting of one design for each use that integrates different human senses. Esperantoplatsen was then transformed into an experience park, taken over by yarn.

Keywords: Ephemeral architecture, crochet, modularity and design for disassembly, soft architecture, in between spaces.

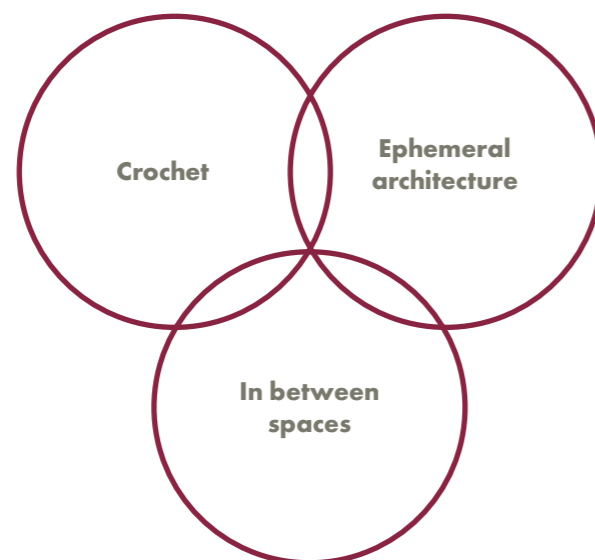
Background and Problem Description

Architecture is defined by permanence, where buildings are designed according to a specific context and have a specific function meant to last for the next decades. With our ever changing society and environment, this becomes more challenging to implement. Natural disasters, global warming and migration due to war or climate change are some reasons to design and build flexible architecture meant to be moved and work in different contexts (Enia & Martella, 2020). Ephemeral architecture challenges this, by providing temporary and flexible structures that revitalize the urban space (Borges Ferreira, 2024). It creates structures that can be used in different contexts, and be assembled and disassembled easily in new contexts (ArchDaily, 2023). It also encourages the community to engage with the architecture, due to it having an active function that invites gathering, socializing & interacting (Borges Ferreira, 2024).

The earliest example of ephemeral architecture are tents and temporary settlements, such as the Roman camps, which is how many cities were constructed. Ephemeral architecture has today evolved to places where entertainment and special occasions are held, for example festivals and other celebrations (Enia & Martella, 2020).

Crocheting is a meditative hand craft that offers a seamless creation of 3D objects that are lightweight, flexible, and resilient. It can create organic forms of different shapes and sizes with varying opacities thanks to the diverse range of stitches and tensions. The fabric's construction can be easily manipulated through increasing and decreasing the loops, making it easy to design different geometries and textures (Baumann, n.d.).

It also creates a tactile, soft and inviting materiality to touch. Due to the crocheted fabric's flexible nature, ability to create forms freely and many options for stitches, it can be an interesting materiality to use for ephemeral architecture. Its lightweightness makes it easy to move from place to place and its flexibility makes it easy to assemble and disassemble. There are a variety of materials that can be crocheted, and many of them are sustainable. For example wool, lyocell, hemp and cotton. The production of the crocheted structures is also sustainable, since it can only be hand made due to crocheted fabrics not being able to be machine made. This can in turn activate the local community by collaborating on creating a structure together that is according to their needs and interests.



Aim and Research Question

How can crocheting be used to create ephemeral and modular architecture that is interactive for the user and revitalize in between spaces in the city?

This thesis aims to uncover the potential of the material properties and techniques within crocheting and how it can be used to create flexible and modular architecture, whilst being interactive for the user. The thesis also explores how in between spaces in an urban context can be activated with this craft.

Relevance for Sustainable Development

- The flexibility of the structures, being able to fit in different contexts and be assembled and disassembled, creates a sustainable use of the structures.
- There are a variety of materials that can be crocheted, and many of them are sustainable. For example wool, lyocell, hemp and cotton.
- The production of the crocheted structures is also sustainable, since it can only be hand made.

Delimitations

- A deep analysis of the structural integrity and weather resistance will not be made.
- Due to time restrictions, a deeper materiality analysis will not be conducted, only form finding will be studied with crochet.

Methodology

Literature studies

- Research and literature reviews of history, theories and reference projects have been made to strengthen the arguments and the process.

Crochet explorations

- The history and theory of the crochet craft has been summarized. A deepdive into the crochet chart symbols and how to read crochet patterns has been made to act as a reading guide for later chapters in the thesis.

- An inventory of traditional stitches has been compiled, where each stitch is presented in two different representation styles; as their crochet chart symbol and as a yarn patch test to further understand the structure and geometry of each stitch.

- Chapter 2 consists of common crochet techniques, where each technique has been analyzed with a yarn patch test, a crochet chart pattern and a few keywords.

Site analysis

- Esperantoplatsen has been chosen as the site for the project. An analysis of the surroundings, attachment points and walkways has been made. A mapping of architectural and ephemeral uses that can be added to the area by crocheting to revitalize and activate the site has also been made. The main uses identified are: To frame a view, sit, climb and enclose.

Analysis of the architectural uses tied to crocheting

- The four identified architectural uses have been analyzed and then tied to the crochet techniques. A compilation of relevant crochet techniques for each use has been collected.

Design proposal

- The design proposal is a combination of each architectural use represented in different architectural techniques that best fits the use, according to chapter 4. The four uses are placed on Esperantoplatsen, where they best fit, according to the mapping from chapter 3. The site is taken over by yarn as an experience park, consisting of different ephemeral additions that revitalize and activate Esperantoplatsen.

Theory

Modularity and design for disassembly

Modularity offers a circular and sustainable design approach that is built upon spatial efficiency, reducing waste and prefabrication. The building process is efficient when using modular pieces, due to the mass production and prefabrication of the modules. Re-construction of these pieces in other locations is also possible because of the fabrication process (Arisya & Suryantini, 2021).

The materials for the modules are calculated and produced specifically for the modules, reducing material waste. These modules can be designed for disassembly, creating a circular design process where the materials are meant to be disassembled and reused at the end of the building's life cycle (Arisya & Suryantini, 2021).

Modular architecture requires a clear and systematic way of describing its construction, for it to be able to assemble, disassemble and reassemble. An illustrative way to describe these instructions can be found within the crochet community. A language is used within the community, consisting of crochet chart symbols, to describe the crochet pieces in a clear and illustrative way. As most crochet pieces are complicated to describe in only words how to make, this gives a clear overview of the instructions. These instructions therefore have great potential to be used as a recipe for modular crocheted tensile structures, as the patterns tell how each stitch is constructed and how these stitches are combined. This combination will be further developed in this thesis, to discover how the crochet patterns can be used as a way of creating modular architecture.

Soft architecture

Soft architecture is defined by its sense of flexibility and fluidity which challenges the typical structures in architecture today, being rigid and static. Often constructed with soft materiality, for example fabric and textiles, it creates a tactile and comforting spatiality that interacts with the user and its surroundings. Additionally, soft architecture is a sustainable design solution that promotes adaptability and responsiveness which in turn creates resilient architecture (Niederholzer, 2024).

References

Crochet playground by Toshiku Horiuchi

A playground hand crocheted where children can climb, hang and jump on. The structure is hung and consists of hexagons with holes, and hanging parts that you can climb up on and swing.

The temporary structures for the 'Conexidade occupation' by Estúdio chão

These temporary structures were designed for the festival held at Praça XV square, in Rio de Janeiro. It consists of a main stage, dining area and chill-out zones. Scaffolding, shading screens and hammocks made of nets were the main parts of the structure, holding activities like lectures, workshops, street performances and skateboarding. This project is "an ephemeral citadel superimposed on the square" (Myers, 2019).

Ark Nova by Arata Isozaki & Anish Kapoor

Ark Nova is a place for cultural events, being an inflatable concert hall that can be moved to different locations. The hall is constructed with a PVC-coated polyester membrane and when inflated is shaped like a toroidal. Ark Nova was created to tour the impacted region of Northeastern Japan that was hit by the tsunami 2011. The tour of concerts was going to symbolize new beginnings for the area (Aerotrope, n.d.).

Net Hasselt (floating landscape) by Numen

The firm Numen designs and builds interactive structures that are made to be explored. One example is Net Hasselt in Belgium, which is a "floating landscape" constructed by nets suspended in the air. It is made to explore "instability, levitation and regression", inviting people to physically interact with the structure (Numen, 2011).

Chapter 1

About crochet

Crochet history and theory about crocheting

The origins of the crochet craft is hard to pinpoint as there are many theories about where it first developed. This is due to the lack of concrete documentation of the craft until the 1800s in Europe. However, it is said that needlework/tambouring from some parts in Asia and North Africa was the starting point for crocheting. Tambouring is similar to crocheting, but with a cloth that the stitches are sewn on to. The cloth was later on removed and crocheting as we know today developed (Marks, 1997).

The development of patterns began in the 1800s, mainly by the established pattern maker Mademoiselle Riego de la Branchardiere, to spread the knowledge of how to crochet different pieces. Historically, people crocheted a variety of things, for example: hunting nets, decorations, clothing, smaller furniture pieces, etc (Marks, 1997).

Crochet toolkit

A few tools are needed when crocheting. The main tools are a hook and yarn, where there are different hook sizes and yarn weights. This creates a variation in the thickness and transparency of the fabric. A needle is needed when sewing the pieces together and patching. Stitch markers are used to help with remembering a specific stitch, for example when increasing, decreasing, or marking the starting stitch when crocheting 3D forms.



Yarn



Crochet hook



Needle



Stitch marker

Crochet chart symbols

In the crochet community, it is common to share patterns of crochet pieces for other people to recreate them. These patterns are often illustrations consisting of symbols of different stitches and techniques. The illustrations show the stitches row for row, where the pattern often begins and ends with a slip stitch. Below are some of the common stitches and techniques included in the patterns.

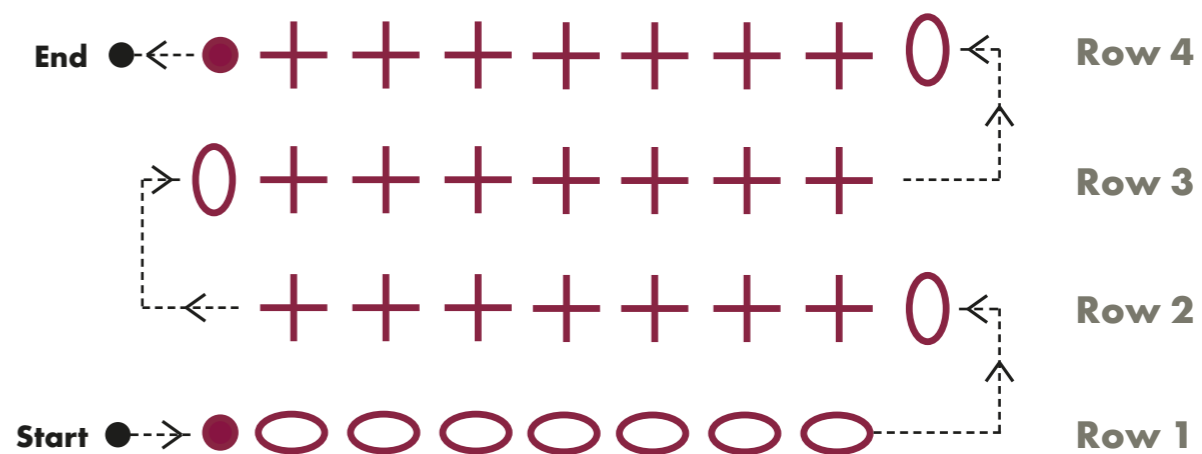
Crochet chart symbols is a language within the crochet community that makes it effective to describe the crochet pieces in an illustrative way. As most crochet pieces are complicated to describe in only words how to do, this gives a clear overview of the instructions.

●	Slip stitch	⋈	Single crochet increase	+	Single crochet	⋈	Double crochet increase
○	Chain 1	⋈	Single crochet decrease	⊥	Half double crochet	⋈	Double crochet decrease
∞	Chain 2	⋈	Half double crochet increase	⊥	Double crochet	⋈	Treble crochet increase
∞	Chain 3	⋈	Half double crochet decrease	⊥	Treble crochet	⋈	Treble crochet decrease

Inspired by diagrams by Haas, 2022 & Ballering, 2023

How to read crochet chart patterns

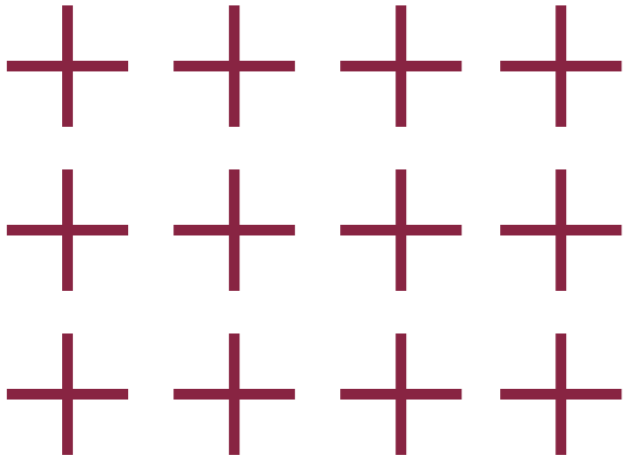
Single crochet chart pattern:



Crochet charts are usually read from the bottom to the top, and row by row in a zigzag pattern. The first and last row starts and ends with a slip stitch. Each row starts with 1-3 chains, depending on the stitch.

Traditional stitches

Single crochet stitch

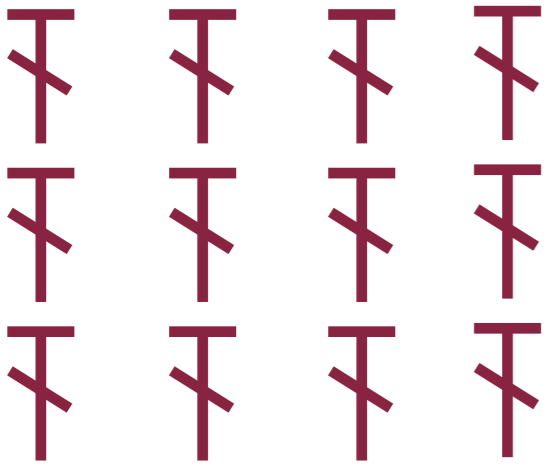


Crochet chart symbol



Yarn patch test

Double crochet stitch

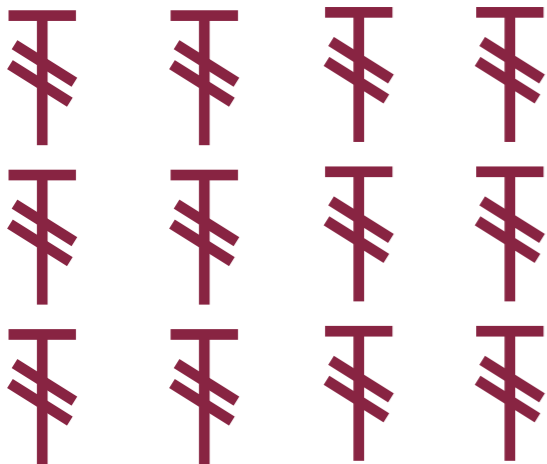


Crochet chart symbol



Yarn patch test

Treble crochet stitch

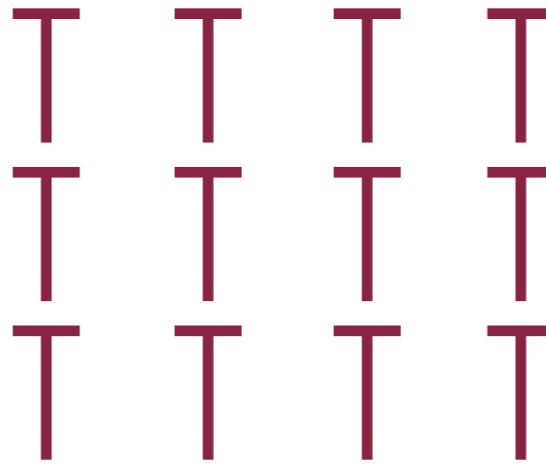


Crochet chart symbol



Yarn patch test

Half double crochet stitch

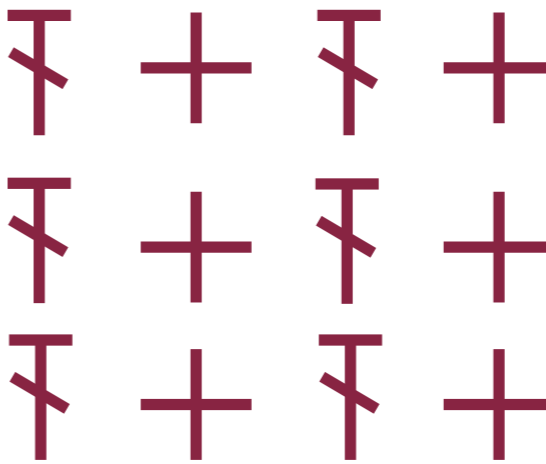


Crochet chart symbol



Yarn patch test

Griddle stitch

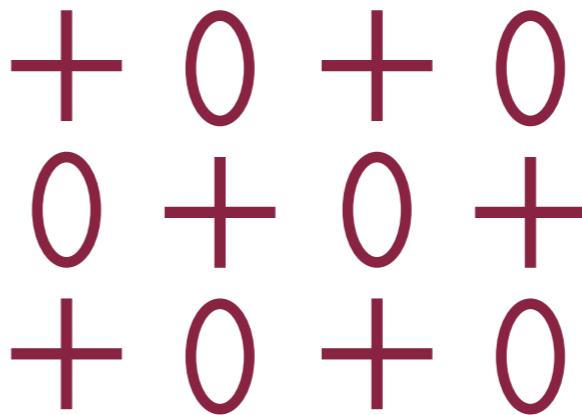


Crochet chart symbol



Yarn patch test

Moss stitch



Crochet chart symbol



Yarn patch test

Chapter 2

Crochet techniques

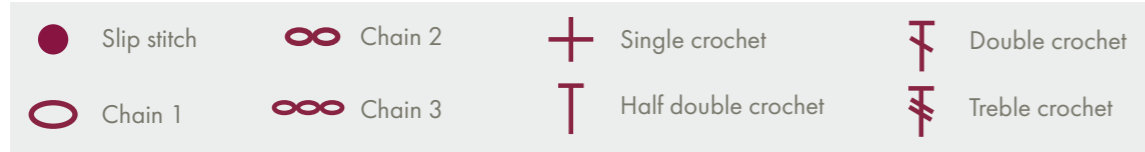
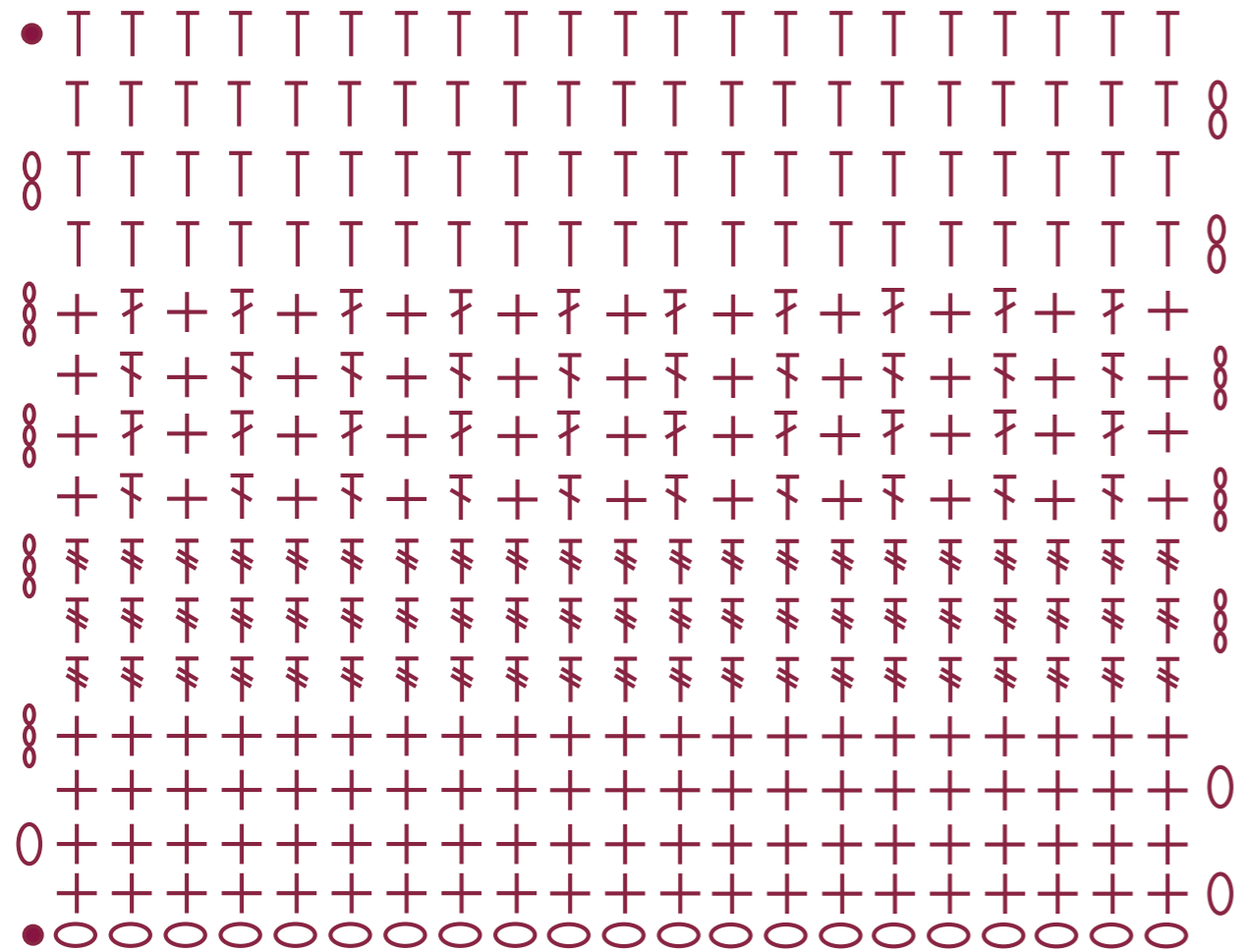
Combining stitches

Vertical volume study

In this exploration the volume of different stitches were compared in the same patch. This shows the different sizes of the stitches and how effective it is to generate volume with some of the stitches. The treble crochet stitch only needed three rows to have the same volume as the other stitches, which needed between 4-5 rows.

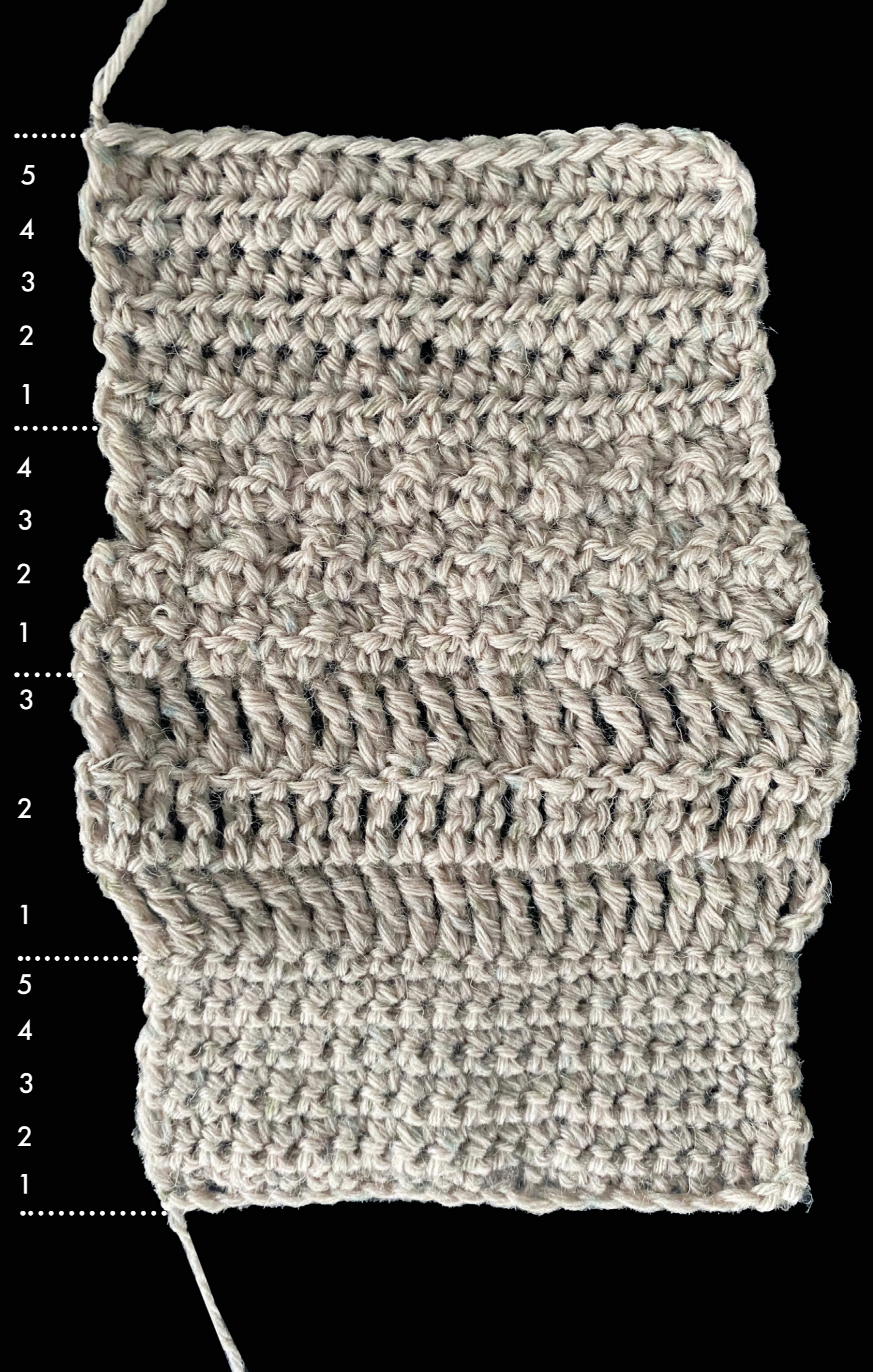
The patch also shows how the different stitches meet. In most cases the border between the stitches is seamless, which makes combining stitches an easy way to create different pieces with various designs and textures.

The pattern



Keywords

Textured, versatile.

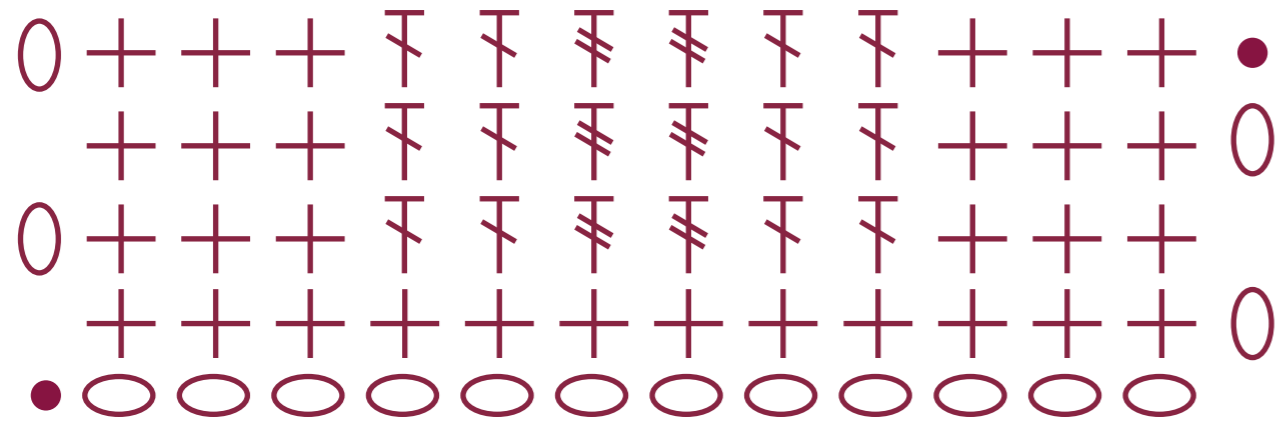


Combining stitches

Horizontal volume study

In this patch the stitches were combined horizontally, in the same row, rather in different rows. This creates different textures, forms and flexibility as seen in the patch. The treble crochet curved out the patch due to the stitches being bigger in comparison to the other stitches.

The pattern



● Slip stitch	+ Single crochet	Ɔ Double crochet
○ Chain 1	⋈ Treble crochet	

Keywords

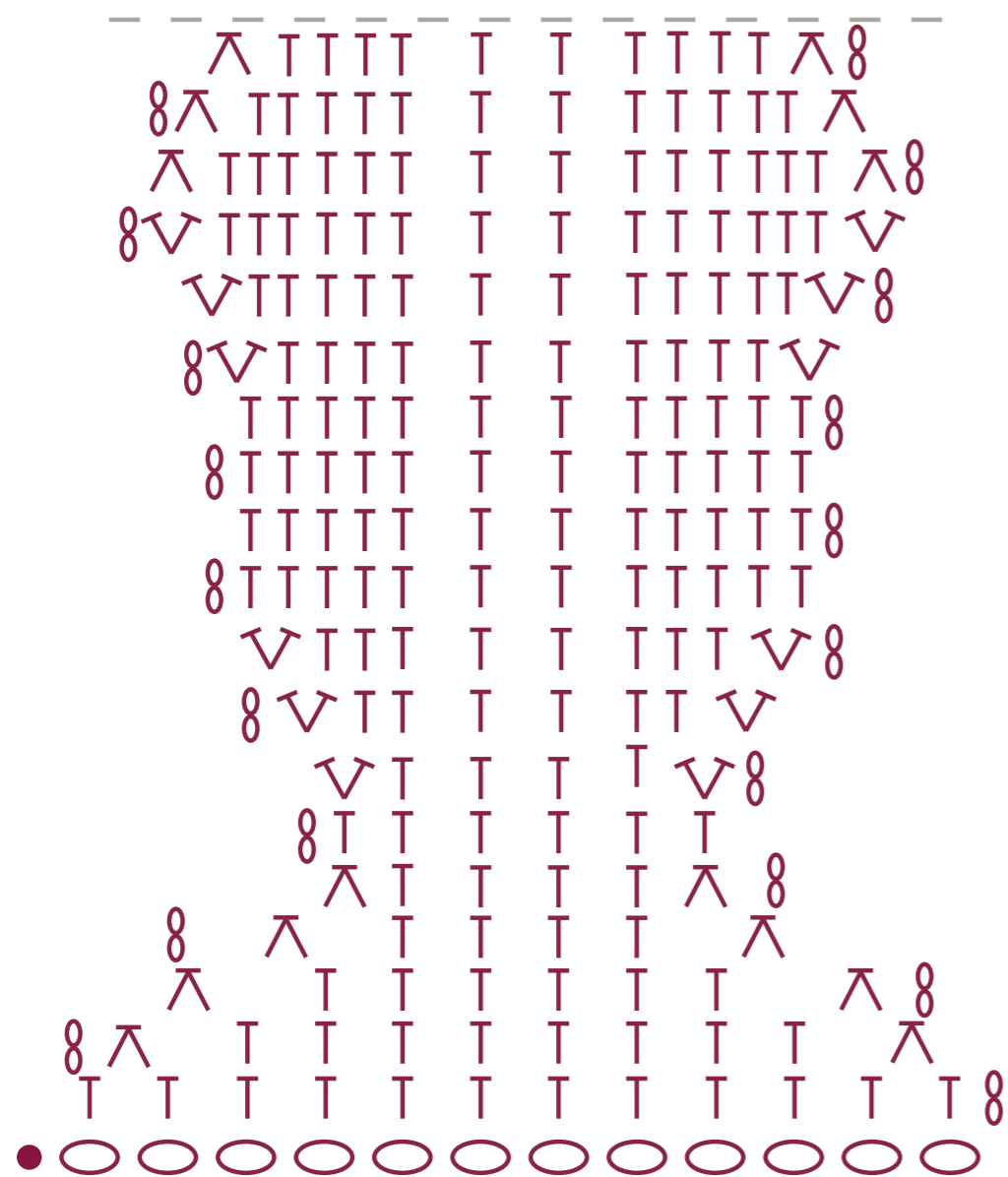
Curved, flexible.



Increase & decrease

Increasing and decreasing is a common crocheting technique that is used to create various shapes. When increasing, two stitches are placed in a singular stitch in the previous row, whilst when decreasing, two stitches are combined together by a singular stitch in the row after. This creates a curved and freeform design that can be customizable and create different shapes.

The pattern



- Slip stitch
- Chain 1
- ∞ Chain 2
- ⊥ Half double stitch
- ∧ Decrease, half double stitch
- ∨ Increase, half double stitch

Keywords

Versatile, flexible, formative, customizable.

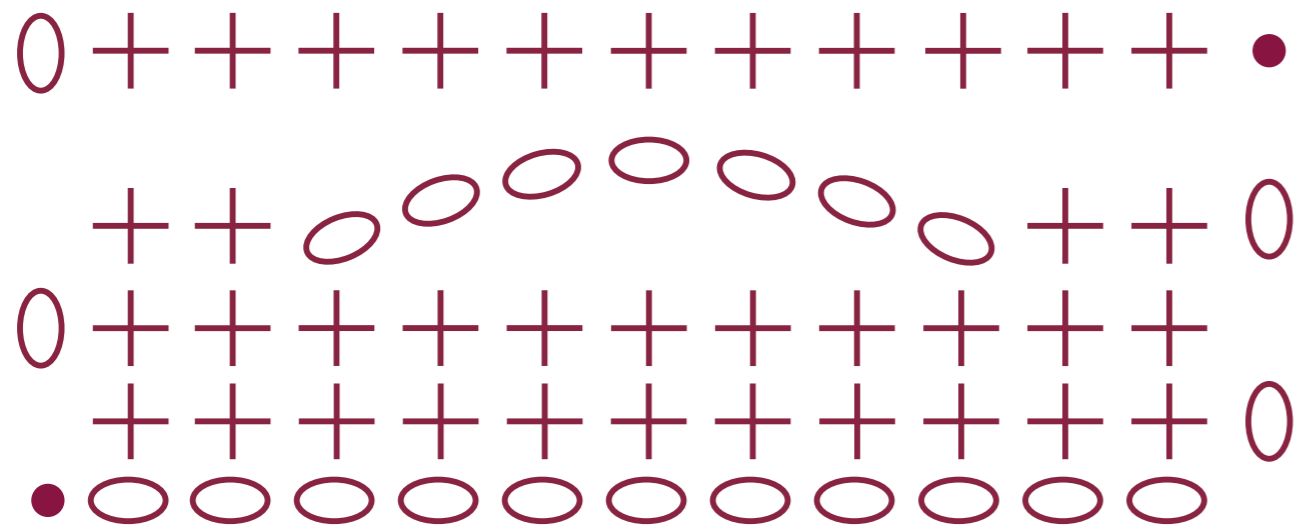


Holes

Creating holes in crochet pieces can be done in different ways. The most common way is to chain multiple stitches, skip a few stitches in the row and slip stitch into the row again. This creates a gap, as shown in the picture. Holes can also be created with increasing and decreasing, then patching together the pieces. This can create different shaped holes.

Holes can be used to create different transparencies and motifs into the piece.

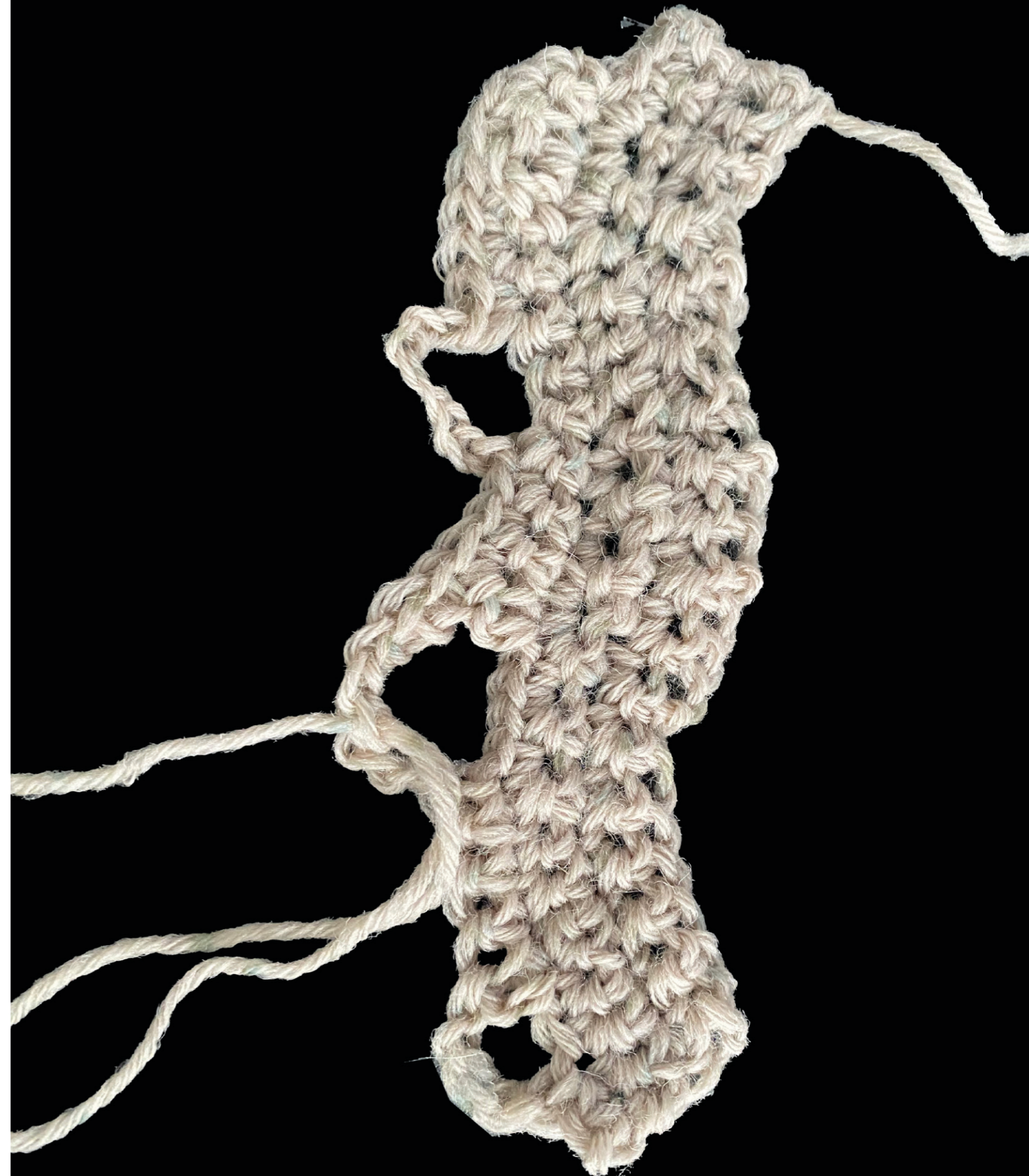
The pattern



● Slip stitch + Single crochet ○ Chain 1

Keywords

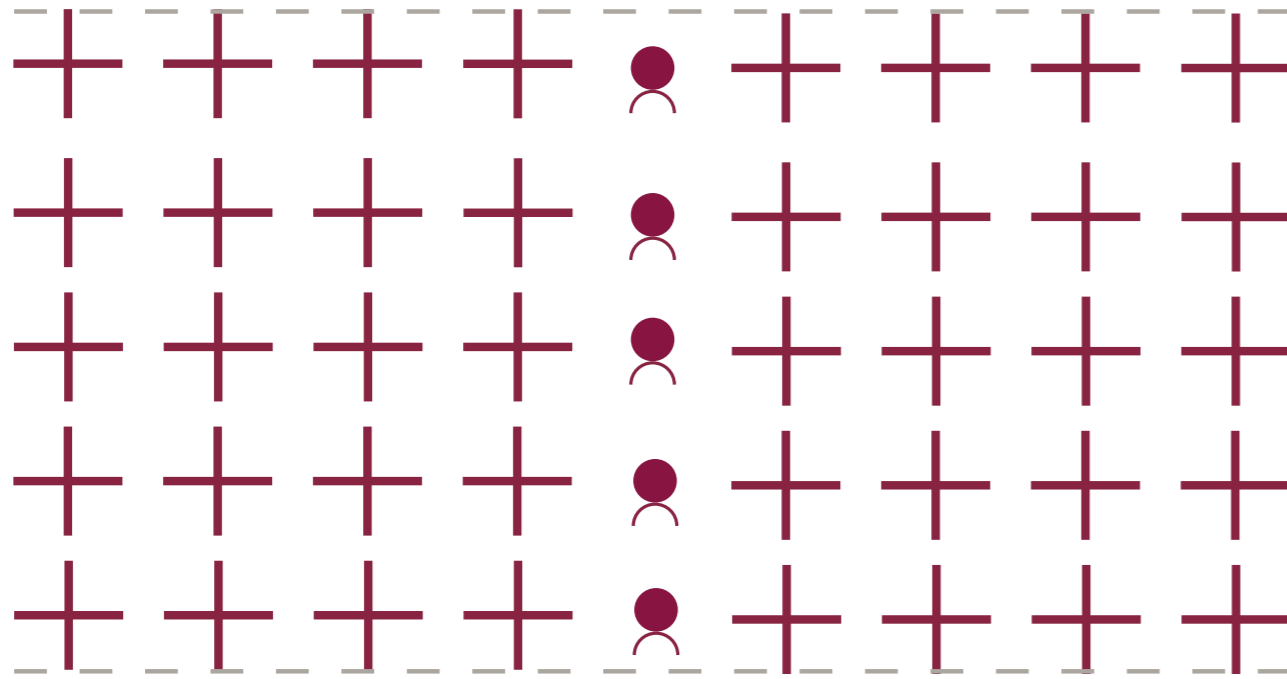
Transparent, textured, dimensional.





Patching

Patching is a versatile technique that can be used to create dynamic pieces with different textures, transparencies and dimensions. This technique is freeform and can be done both in 2D and 3D. The pieces created with patching are customizable and specific to a function and context, which makes the technique relevant for many different uses.

The pattern



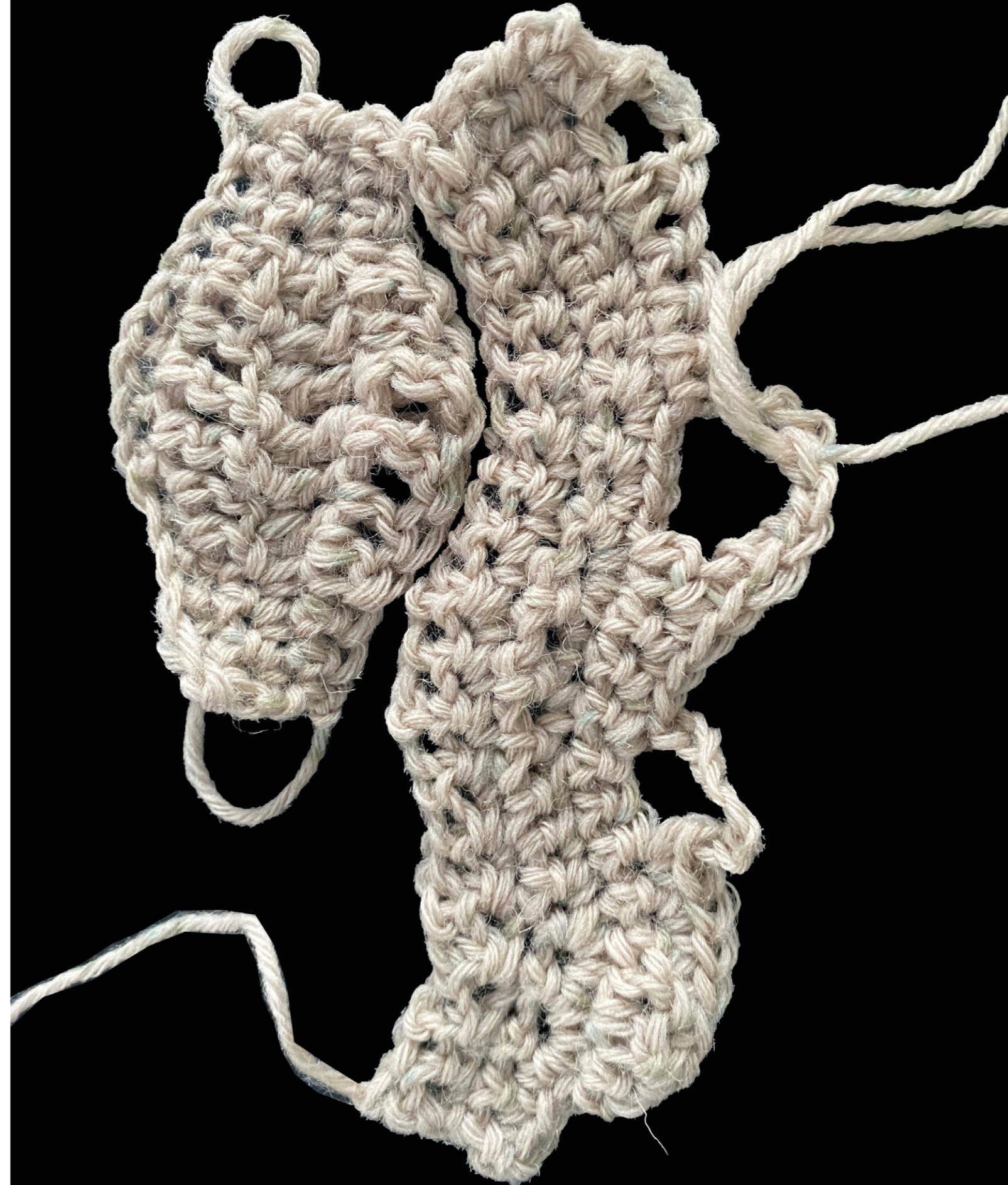
 Slip stitch worked in the backloop only

 Single crochet

Inspired by diagrams by Coppom, 2024

Keywords

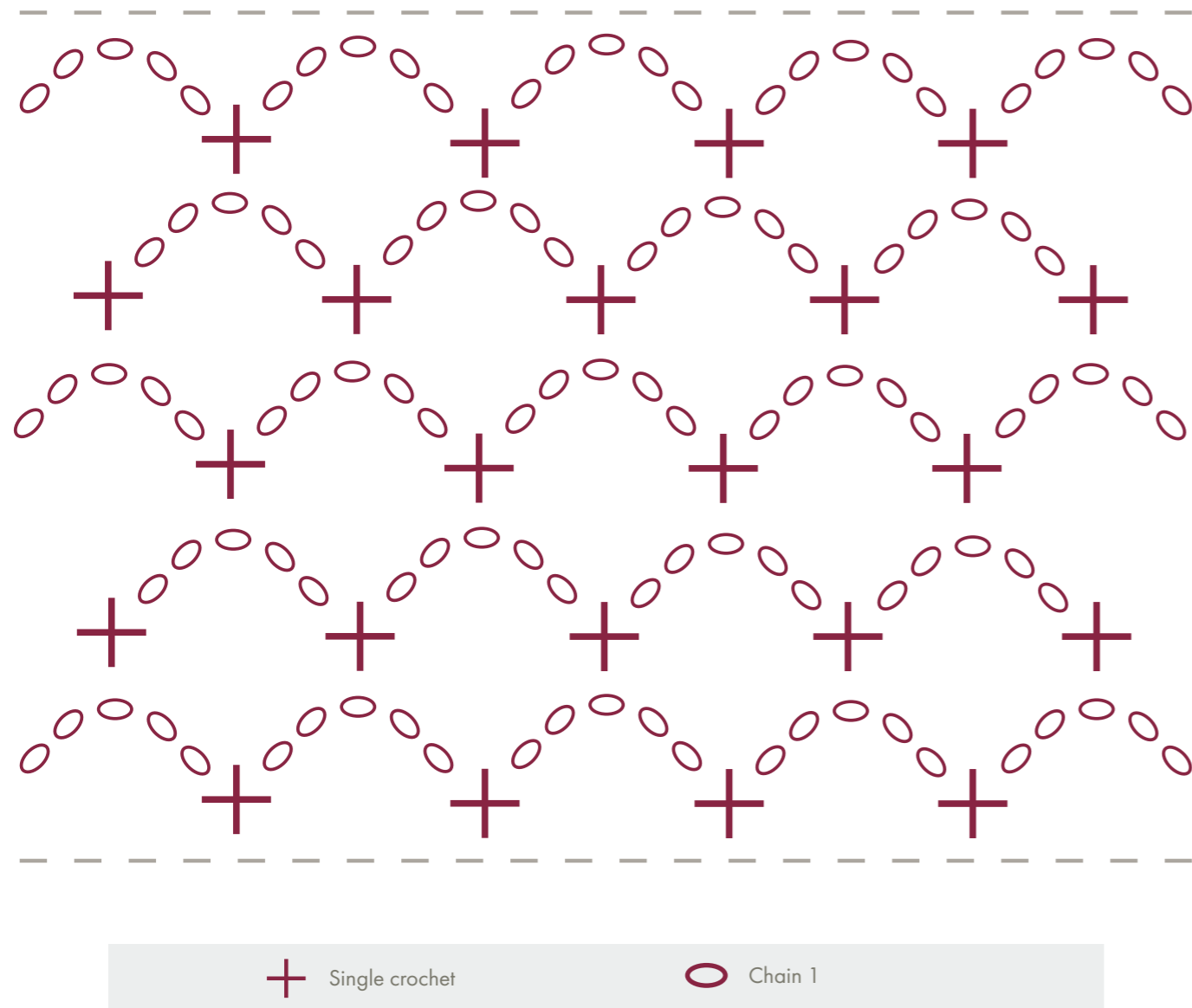
Textured, versatile, formative, shaping.



Mesh

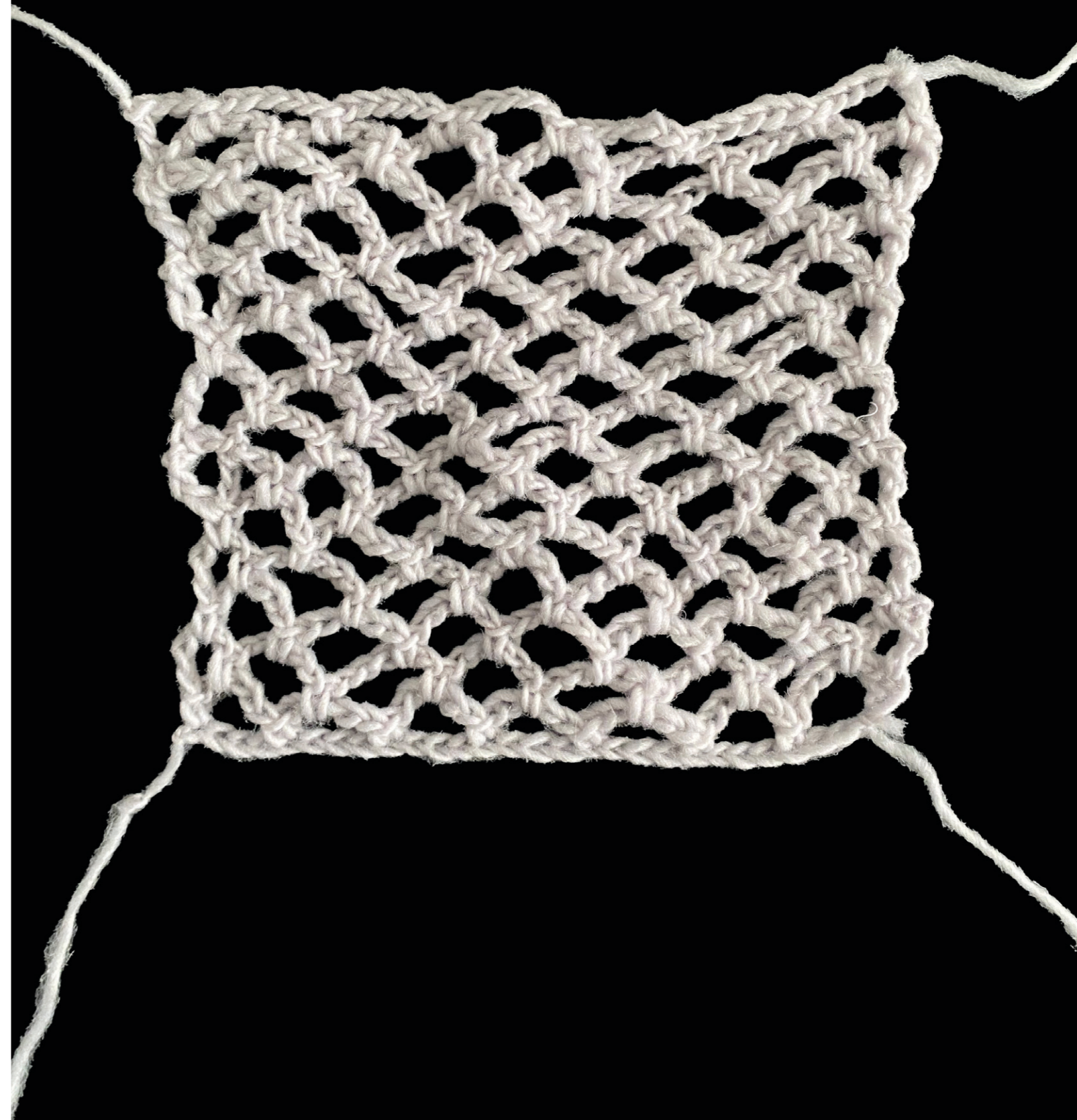
Mesh crochet creates a flexible, transparent and versatile fabric. It can be suspended in various ways and be modular. The attachment point can be placed anywhere on the fabric, due to its texture and structure. This can create different shaped spatialities, both open and enclosed.

The pattern



Keywords

Flexible, transparent, versatile, modular.



Freeform mesh

Similar to mesh crochet, freeform mesh is a flexible, transparent and versatile fabric. It also can be suspended in multiple ways and have different attachment points. The difference is due to its freeform shape, it is more customizable than modular, and can have different densities and transparencies. This can create pieces that are specific to a function and a context, which makes the technique relevant for many different uses.

Freeform crochet is done by freehanding the stitches. It is similar to painting, but with a hook and yarn, where you are free to crochet different shapes and create unique patterns.

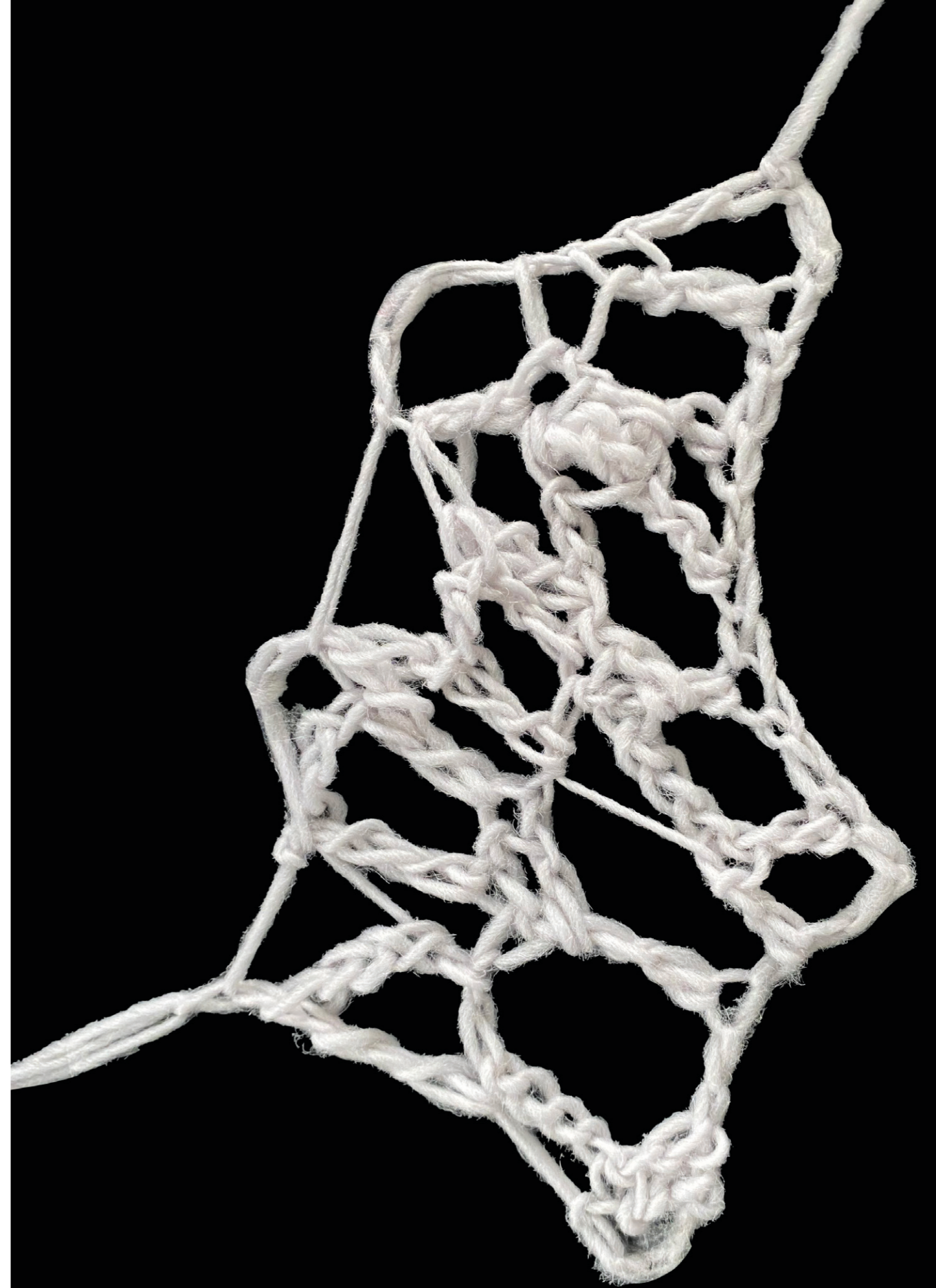
The pattern

No pattern, a mix of these stitches:

● Slip stitch	✕ Single crochet increase	+ Single crochet
○ Chain 1	△ Single crochet decrease	┐ Half double crochet
∞ Chain 2	∧ Half double crochet increase	┘ Double crochet
∞ Chain 3	∨ Half double crochet decrease	┘ Treble crochet

Keywords

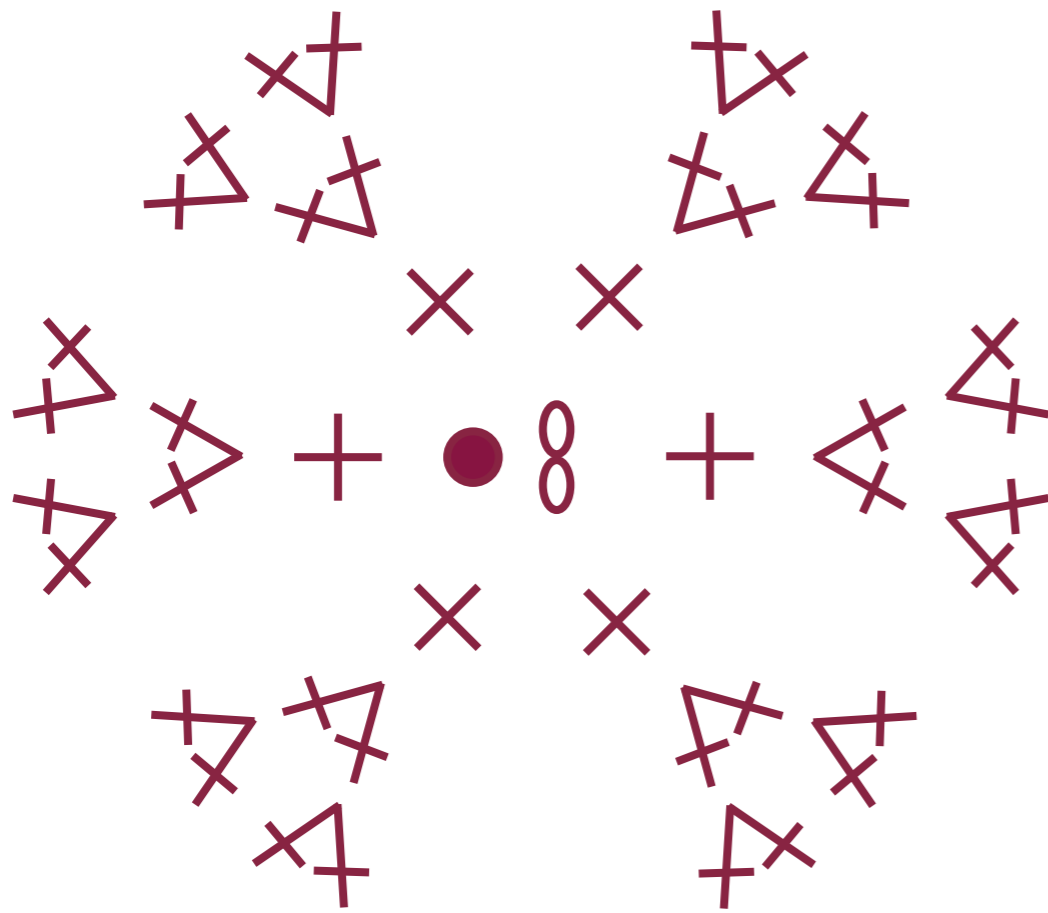
No rules, flexible, transparent, versatile.



3D forms

A distinctive characteristic of the crochet craft is that it is able to create 3D shapes seamlessly. This adds a new dimension when creating architecture with crocheting. The 3D forms are usually created around a loop, with the increasing and decreasing technique to achieve curvature in the crochet piece. This technique is free and multiple different shapes can be created with it.

The pattern



- | | |
|------------------|---------------------------|
| ● Slip stitch | ∞ Chain 2 |
| + Single crochet | ⋈ Single crochet increase |



Keywords

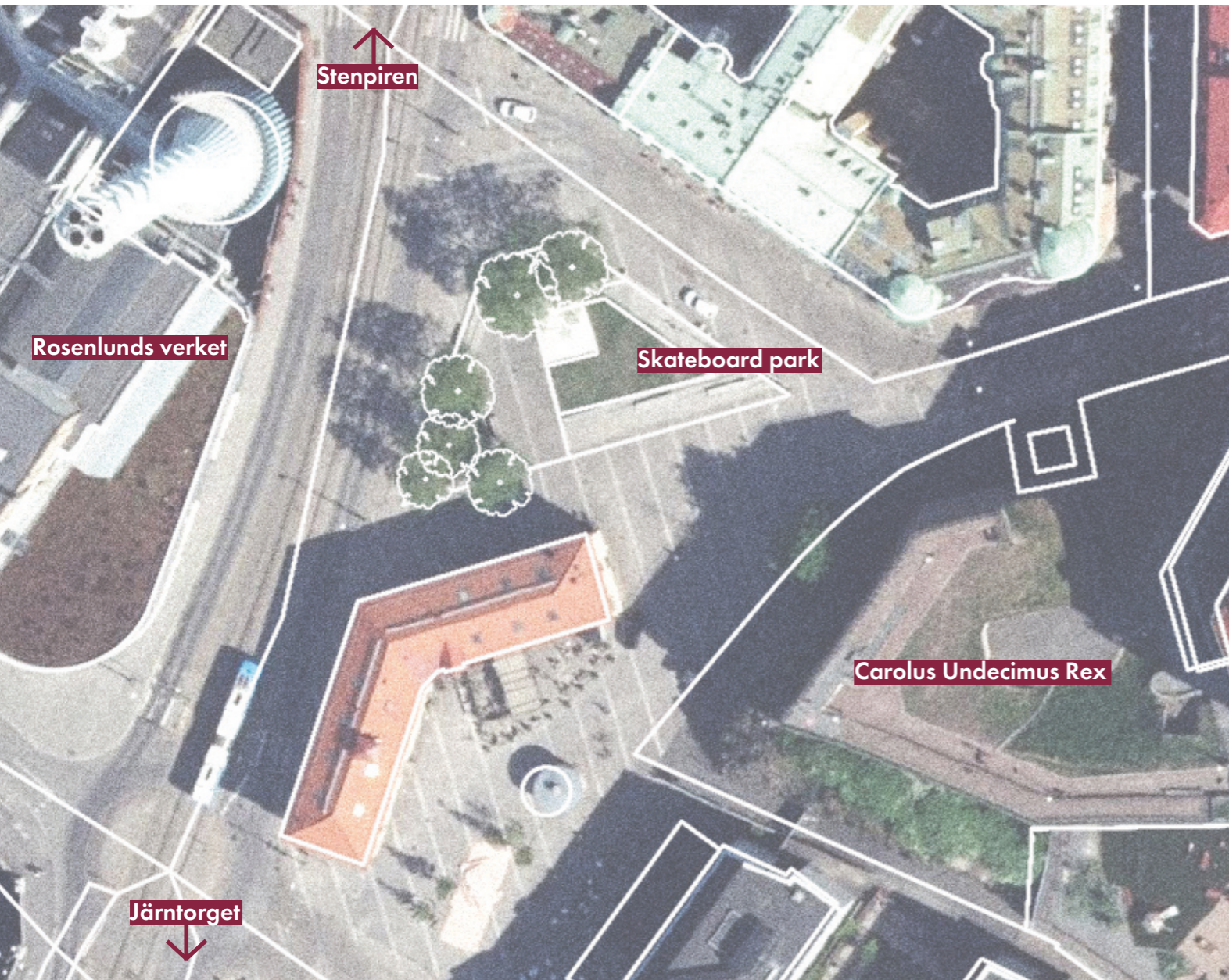
Dimensional, formative, versatile.

Chapter 3
The site

Site - Esperantoplatsen

Esperantoplatsen is a small town square located between Stenpiren and Järntorget. It is surrounded by smaller businesses, cafés and shops. In the heart of the site, a skateboard park is located consisting of greenery and benches. Esperantoplatsen is named after the esperanto movement, which is about spreading the international and equal language of Esperanto (Göteborgs Esperantoförening, n.d.), hence the esperanto flag in the middle of the site (Göteborgs stad, n.d.).

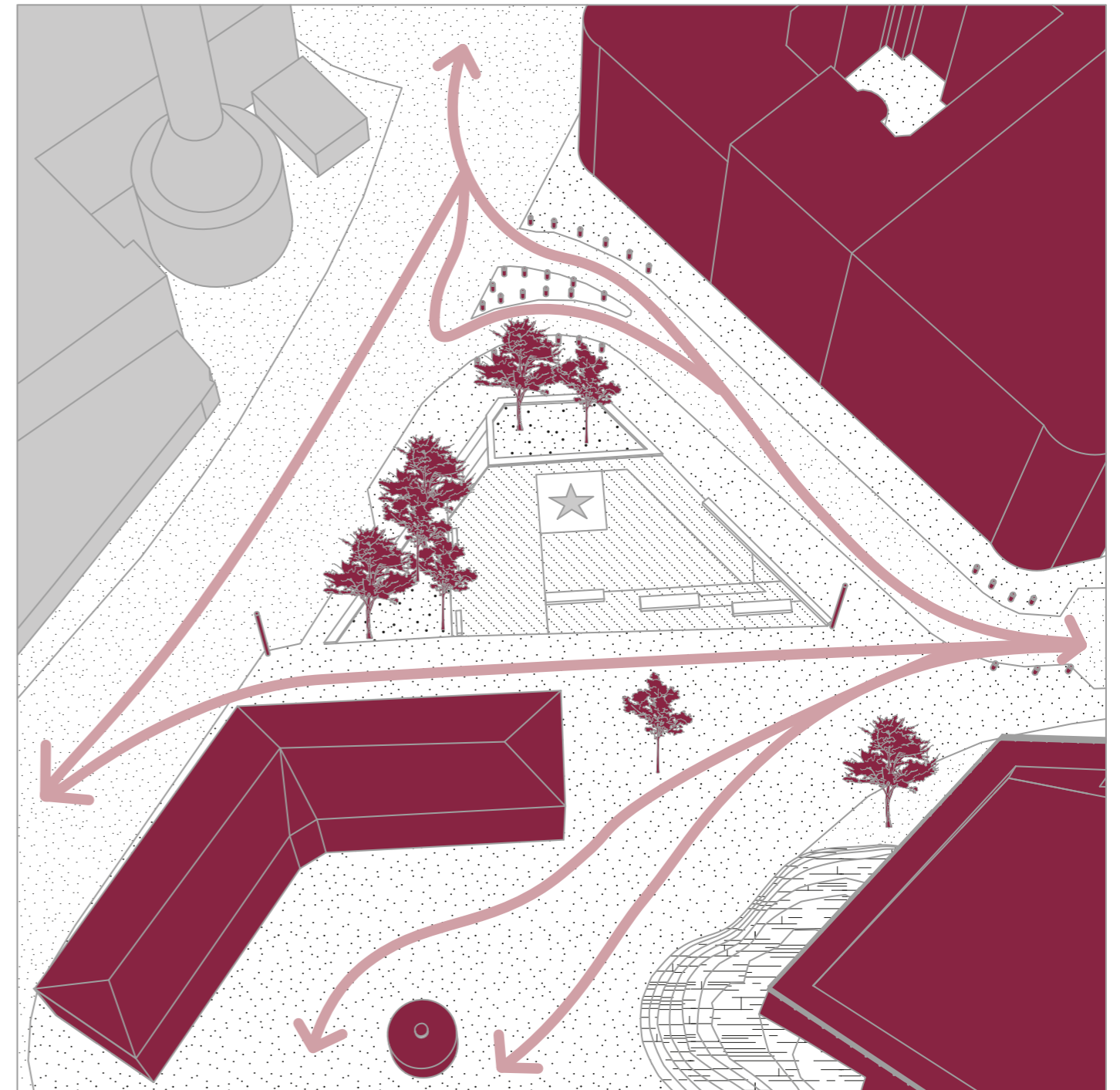
In the southeast, the bastion Carolus Undecimus Rex is located. From the bastion, you can overlook the site and get a view over the rest of the city.



Lantmäteriet, n.d. (image edited by author)

Mapping

A mapping of the surroundings, walkways and attachment points has been made. The walkways surround the skateboard park and there is a wide variety of attachment points, ranging from building facades, trees, street lights and bollards. The scale and distances of the area is suitable for different crochet add ons.



■ Attachment points ■ Walkways ■ Surroundings

Photos

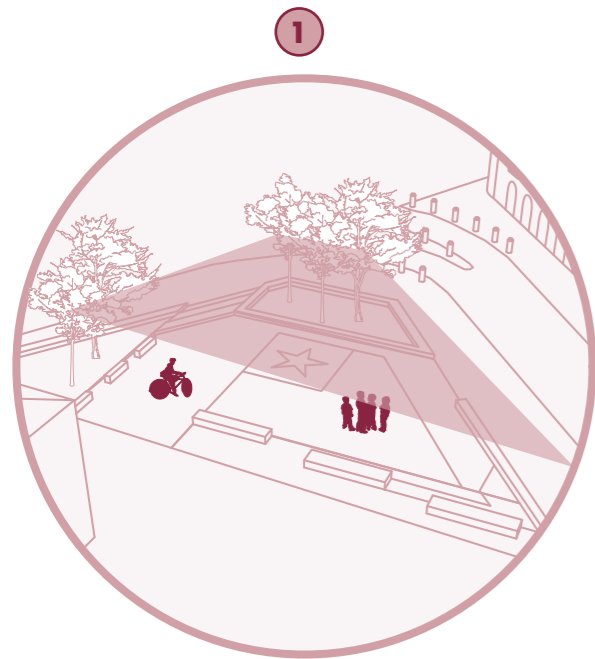


Photos from the bastion



Site - Mapping

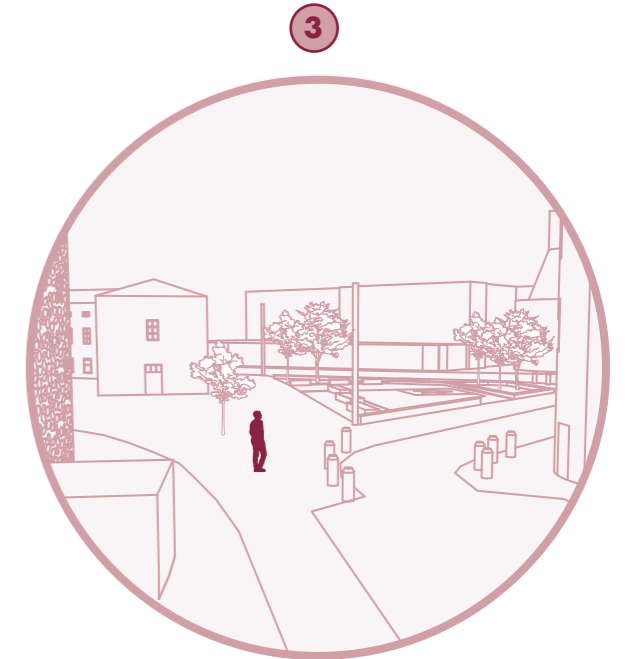
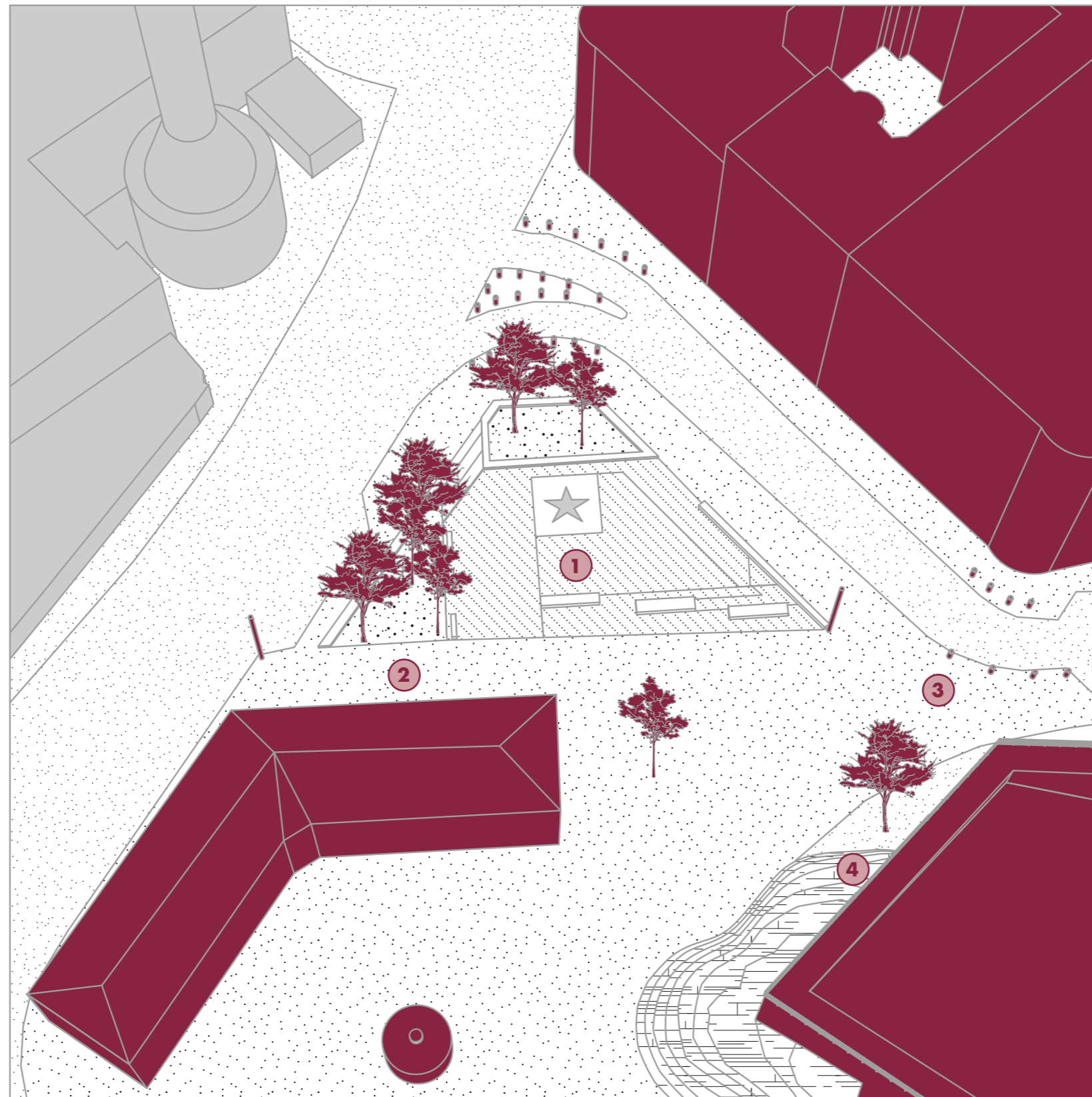
While on the site, I have identified some architectural and ephemeral uses that can be added to the area to revitalize and activate it. The main uses identified are: To frame a view, sit, climb and enclose.



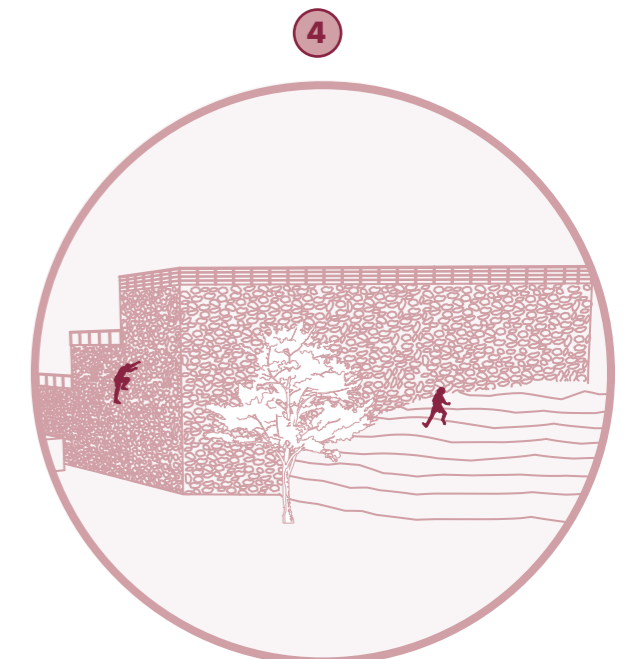
1
Enclose



2
Sit



3
View



4
Climb

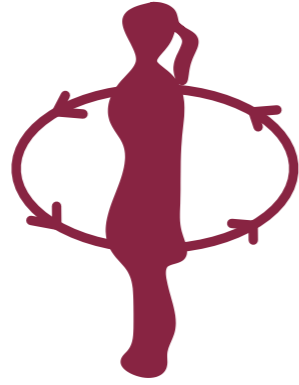
Chapter 4

Crochet in an architectural setting

Architectural uses with crocheting

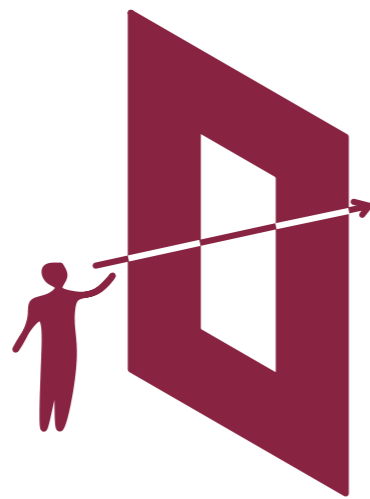
Due to the crochet fabric's many qualities, such as being flexible, lightweight and transparent, there are many ephemeral opportunities that could be implemented on the site. Four main architectural uses that will be further explored and tied to crocheting are these below:

Enclose



Crocheted fabric can be hung and suspended in many different ways, which gives different options for enclosing spatialities.

View



With crocheting techniques that enable creation of holes in the crocheted fabrics, there are possibilities of framing and focusing on specific views.

Climb



Due to the flexibility and structure of the crocheted fabric, there are possibilities of creating a hanging fabric that could be climbed on.






Sit








The crocheted fabric could be suspended on a lower height and be used as a hanging mat for people to sit, lay and sway on.

Compatibility between crochet techniques and architectural uses






An analysis of the crochet techniques and the architectural uses has been done in comparison to each other. The most compatible architectural uses to technique has been compiled in the diagrams below.

Combining stitches (vertically)	Compatible with the uses:	
		
		

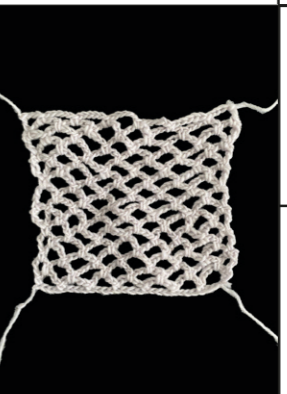




Combining stitches vertically is mainly about creating different textures and opaque fabrics. This is why it is not compatible with view.

Combining stitches (horizontally)	Compatible with the uses:	
		
		






Combining stitches horizontally creates different forms and is very versatile, making it compatible with all uses.

Patching	Compatible with the uses:	
		
		






Patching is a very diverse technique that can be used to create different crocheted pieces, making it compatible with every use.

Mesh	Compatible with the uses:	
		
		

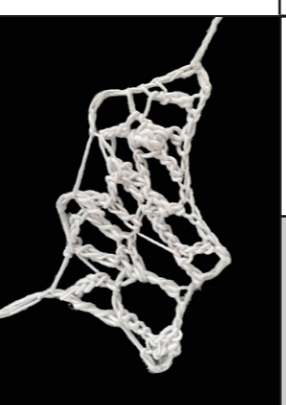




Mesh is a flexible and transparent fabric that can be suspended in many different ways. It is compatible with all uses besides View, as it doesn't create a distinct opening that frames a view.

Increase & decrease	Compatible with the uses:	
		
		


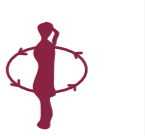



Similar to combining stitches horizontally, this technique is versatile, and even more formative than the previous technique, making it compatible with all the uses.

Holes	Compatible with the uses:	
		
		

Creating holes is a technique best suited for framing a view, and also creating fabrics with smaller openings for people to climb on, to get a good grip on the fabric.

Freeform mesh	Compatible with the uses:	
		
		

Freeform mesh creates a textured and irregular fabric that is most compatible with *Enclose* and *Climb*. Due to its irregularity, it is less compatible with *Sit* and *View*.

3D forms	Compatible with the uses:	
		
		

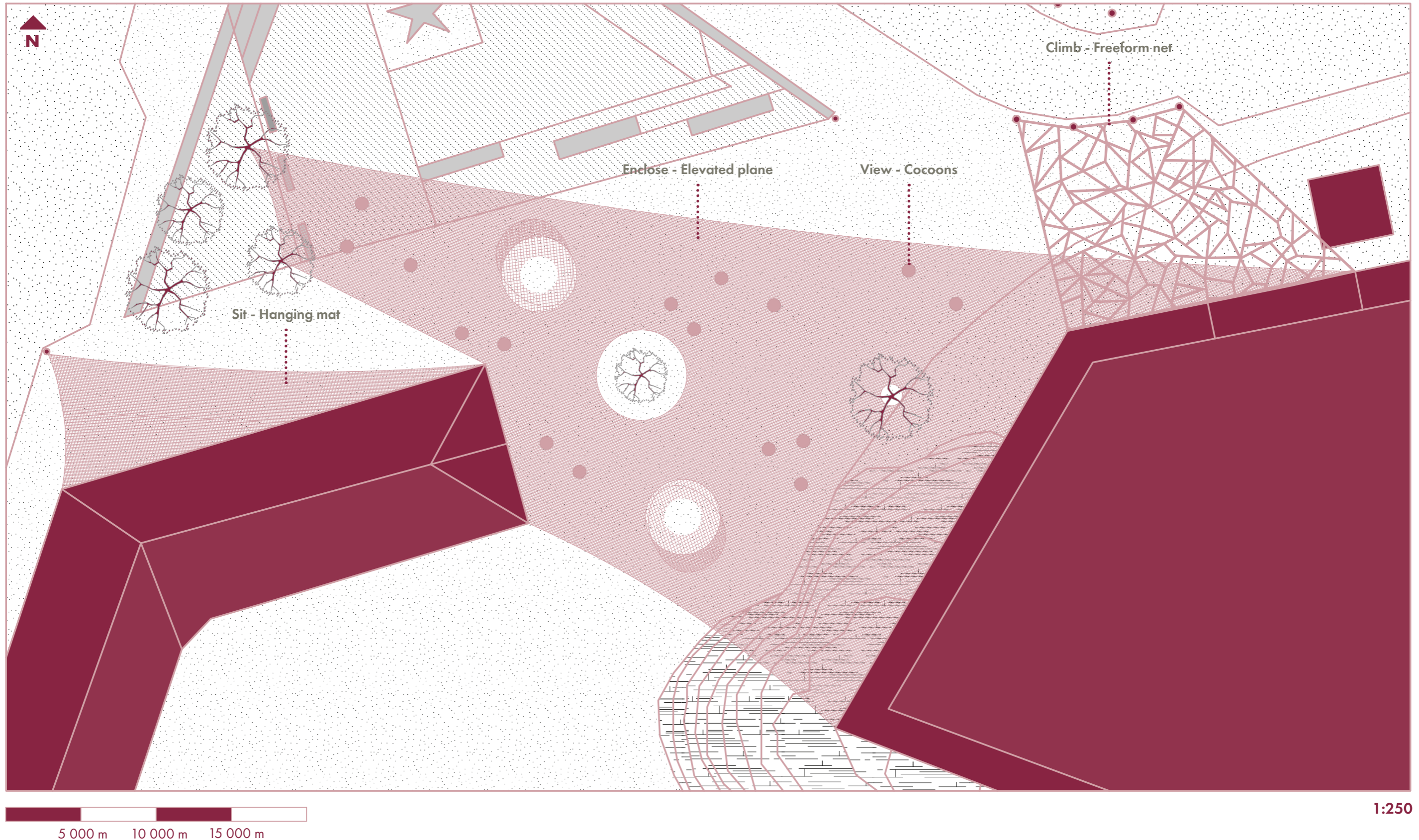
3D forms is a very versatile technique that can create different crocheted pieces that are dimensional and fit every use.

Chapter 5

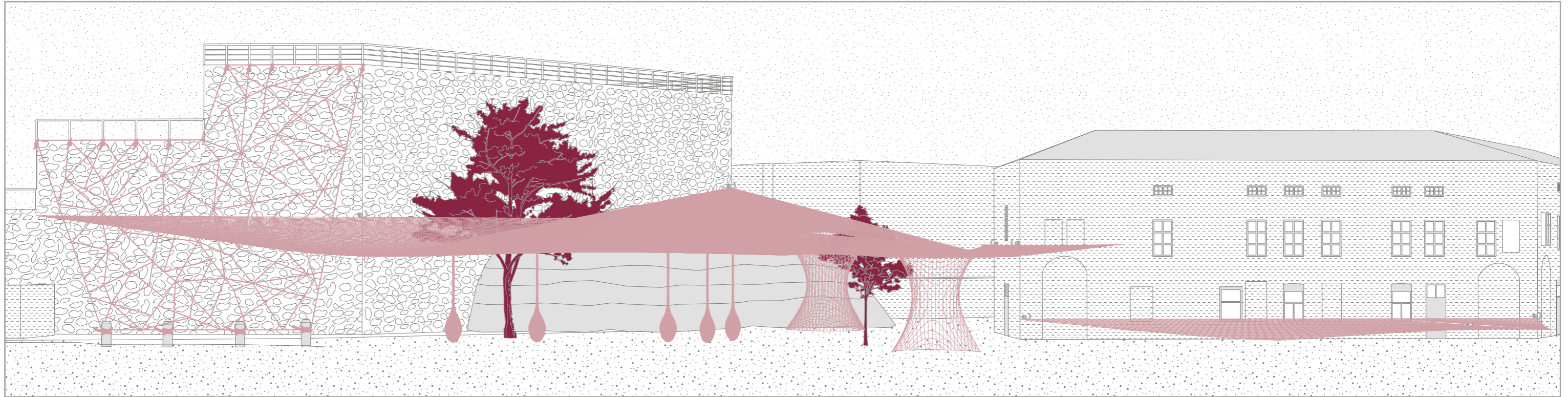
The design proposal

Design proposal - Yarn takeover

The design proposal is a combination of each architectural use represented in different architectural techniques that best fits the use, according to chapter 4. The four uses are placed on Esperantoplatsen, where they best fit, according to the mapping from chapter 3. The site is taken over by yarn as an experience park, consisting of different ephemeral additions that revitalize and activate Esperantoplatsen.

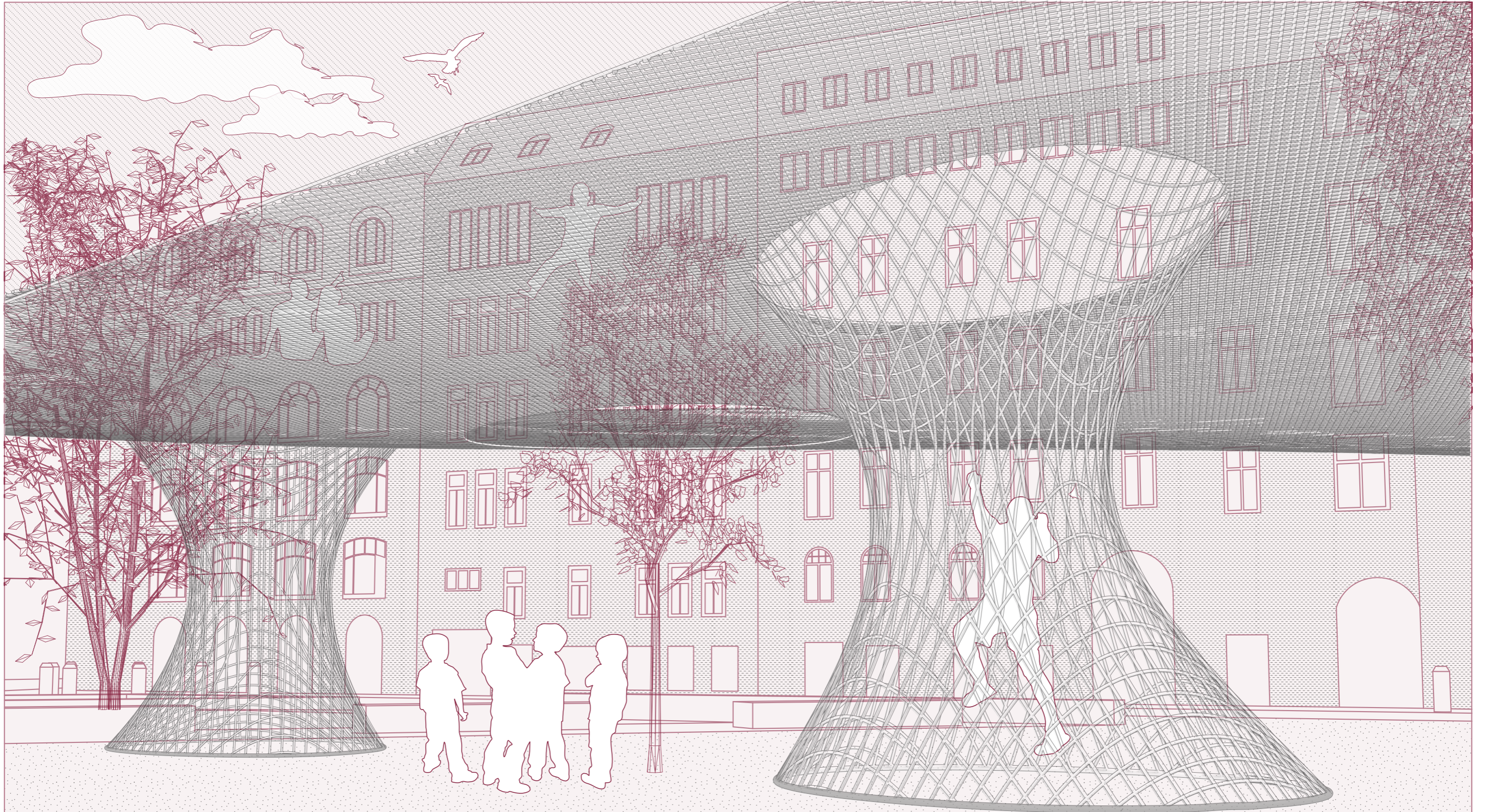


Section



Enclose

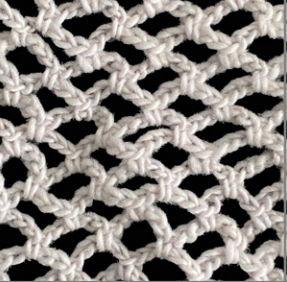
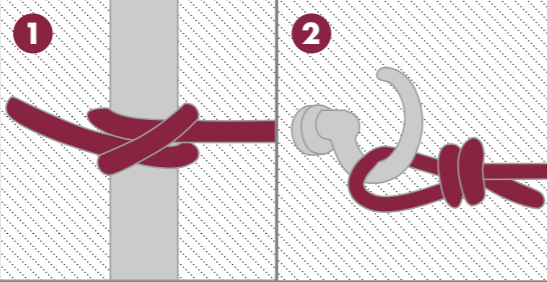
The architectural use *Enclose* is represented with an elevated crocheted mesh fabric that covers the open walkway area southeast to the skateboard park. This is to define a spatiality around the area and enclose it. The fabric is suspended at a 3-5 meter height from the ground. In the fabric there are holes for the trees, and two of the holes have vertical tunnels attached to them. These tunnels can be climbed on to reach the top of the enclosing fabric. Here you can run around, lay and hang out at an elevated level to overlook the area. This creates a playful addition to the area where it can be explored from another perspective.

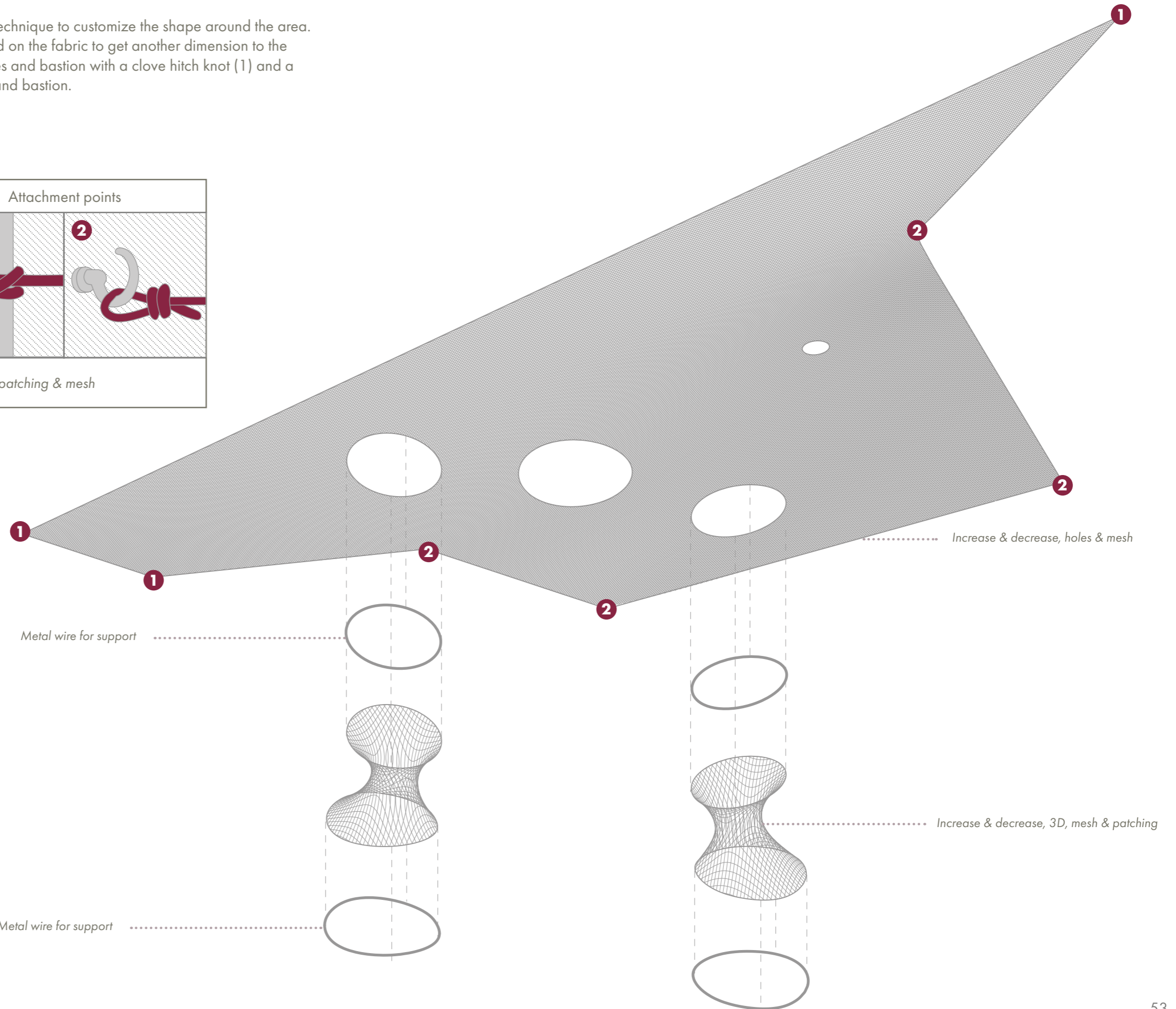


Enclose - parts

The mesh fabric is crocheted with the increase & decrease technique to customize the shape around the area. Holes are added to the fabric and 3D cylinders are patched on the fabric to get another dimension to the piece. The fabric is attached to one of the facade walls, trees and bastion with a clove hitch knot (1) and a slip knot around hooks (2) that are attached to the facade and bastion.

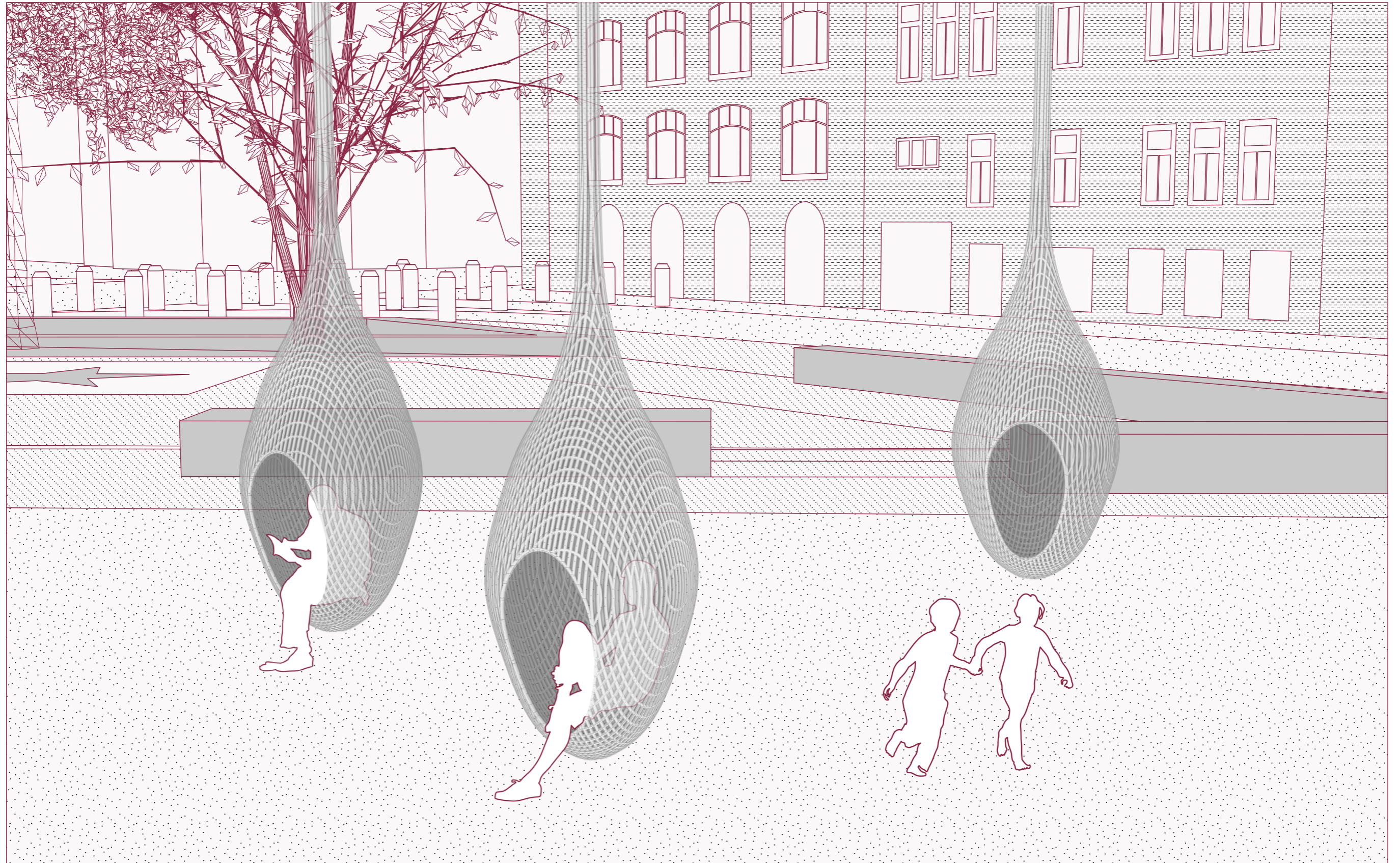
Toolbox:

Material swatch	Crochet stitches	Attachment points
	• 0 +	
Techniques: Increase & decrease, holes, 3D, patching & mesh		



View



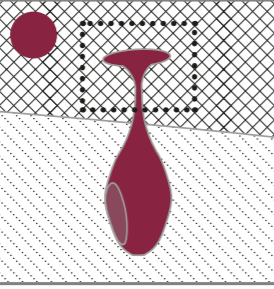
The architectural use *View* is represented with cocoons that are scattered around the area under the elevated enclosing plane. The cocoons are angled towards different views in the area. Some are placed in groups, where multiple people can sit next to each other and others are more secluded for a more private feeling. Here you can sit and relax in an enclosed space that frames different views in the area.

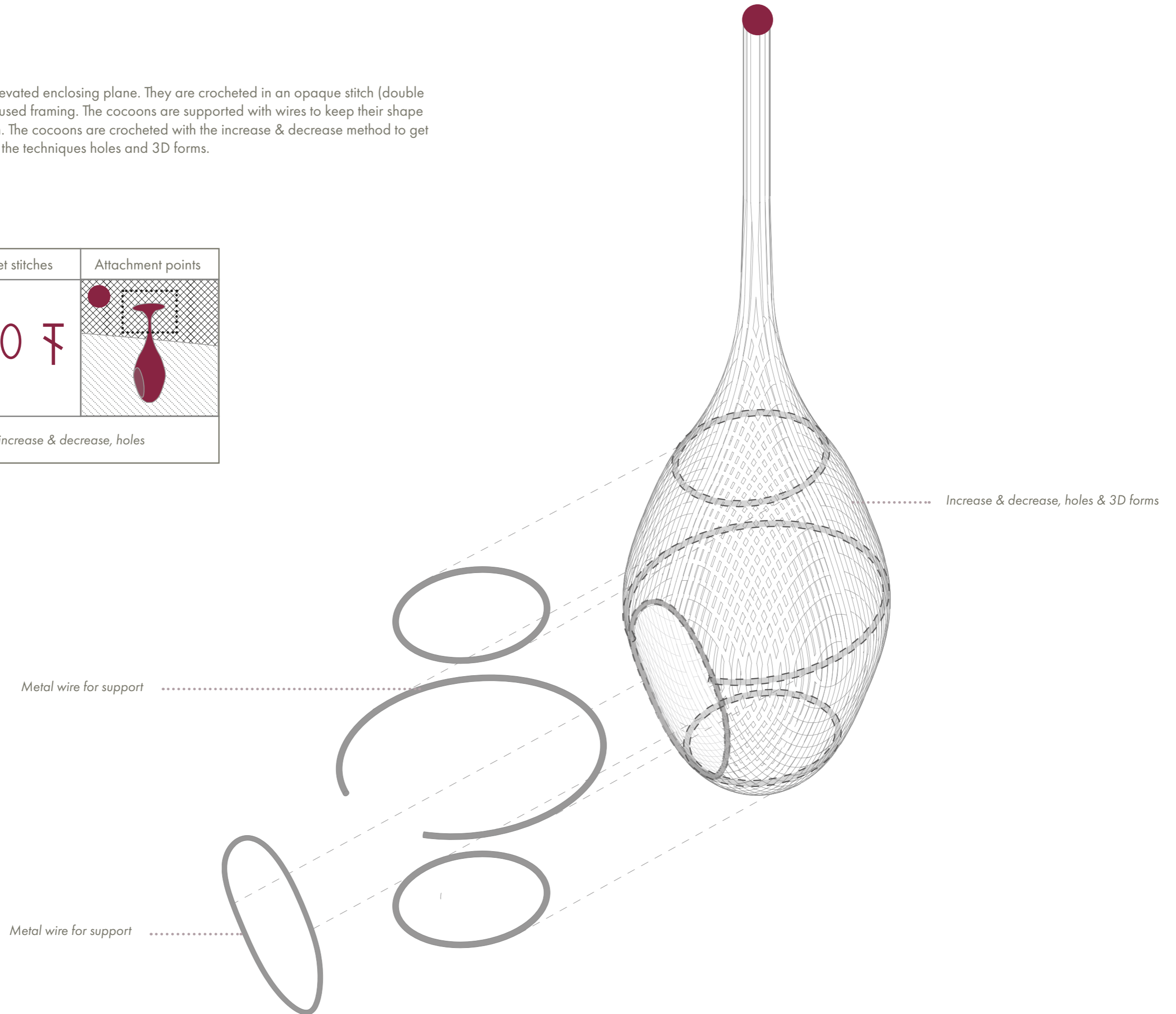


View - parts

The cocoons are hung from the elevated enclosing plane. They are crocheted in an opaque stitch (double crochet stitch) to have a more focused framing. The cocoons are supported with wires to keep their shape when people aren't sitting in them. The cocoons are crocheted with the increase & decrease method to get the curved form, whilst also using the techniques holes and 3D forms.

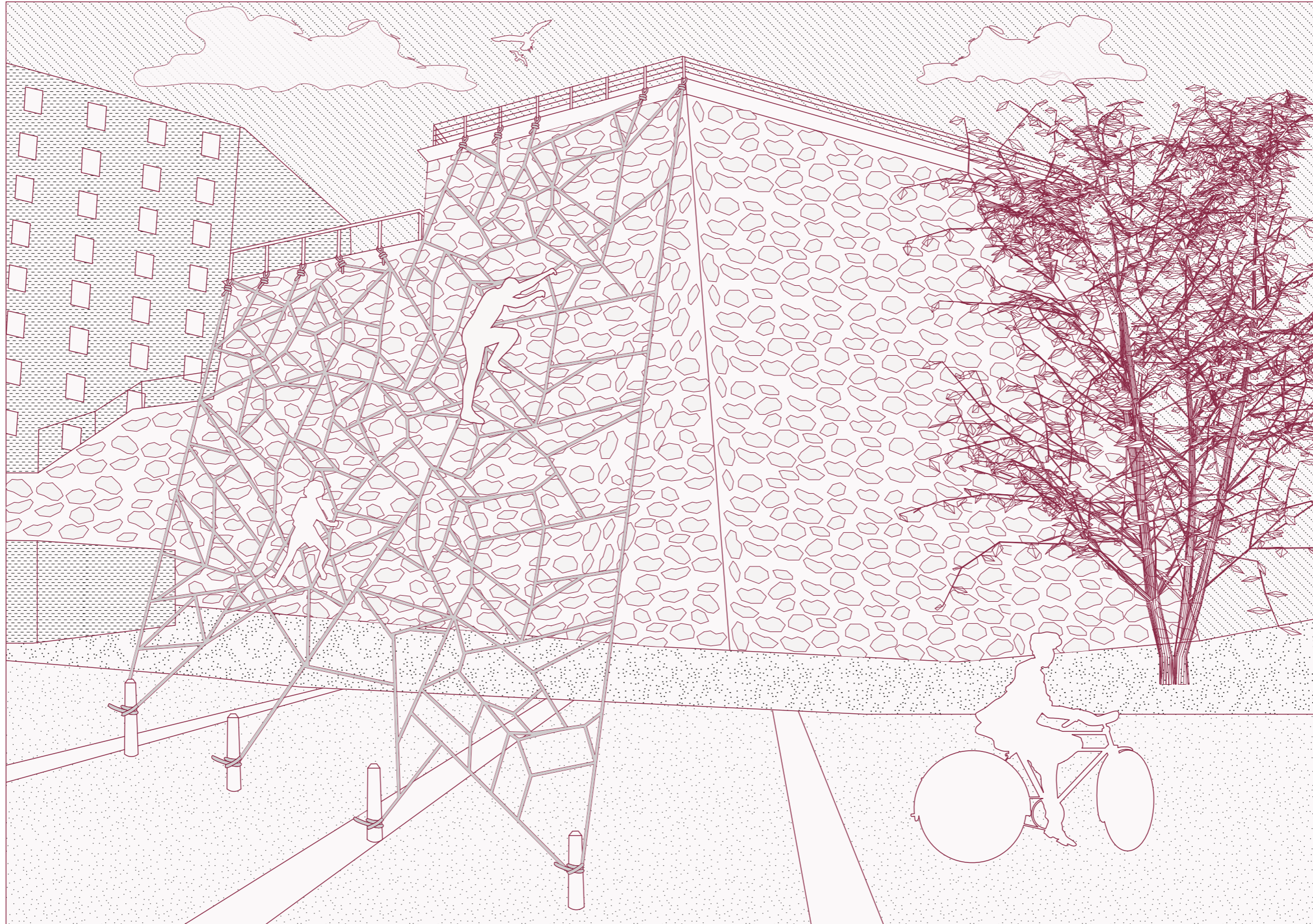
Toolbox:

Material swatch	Crochet stitches	Attachment points
		
Techniques: 3D forms, increase & decrease, holes		



Climb

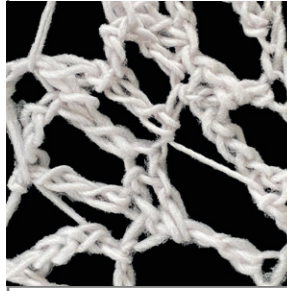
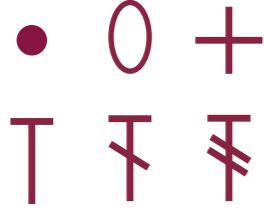
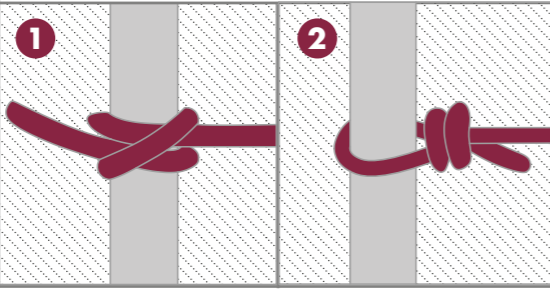
The architectural use *Climb* is represented with a climbing fabric that is attached to the bastion. The bastion was chosen for this use due to its varying heights and scale. The fabric is crocheted with the freeform mesh technique to achieve different shaped holes and forms in the fabric to make the climbing experience varied. A part of the enclosing elevated plane is between this fabric and the bastion to catch people if they fall. Other safety measures can be taken, such as using a climbing rope or placing a mattress on the ground around the climbing area.



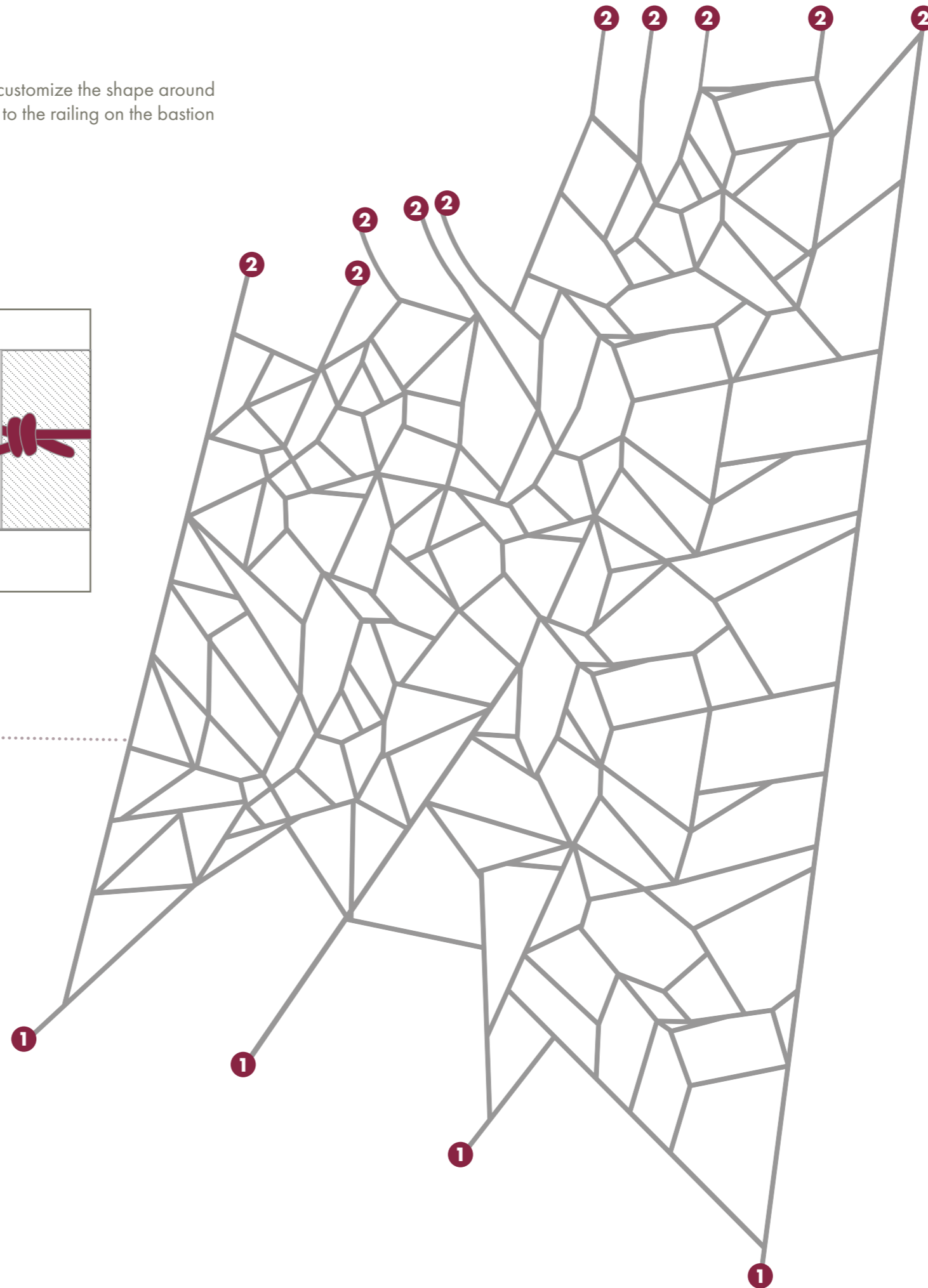
Climb - parts

The freeform mesh fabric is crocheted with the increase & decrease technique to customize the shape around the bastion. The fabric is attached to the bollards with 4 clove hitch knots (1) and to the railing on the bastion with 10 slip knots (2).

Toolbox:

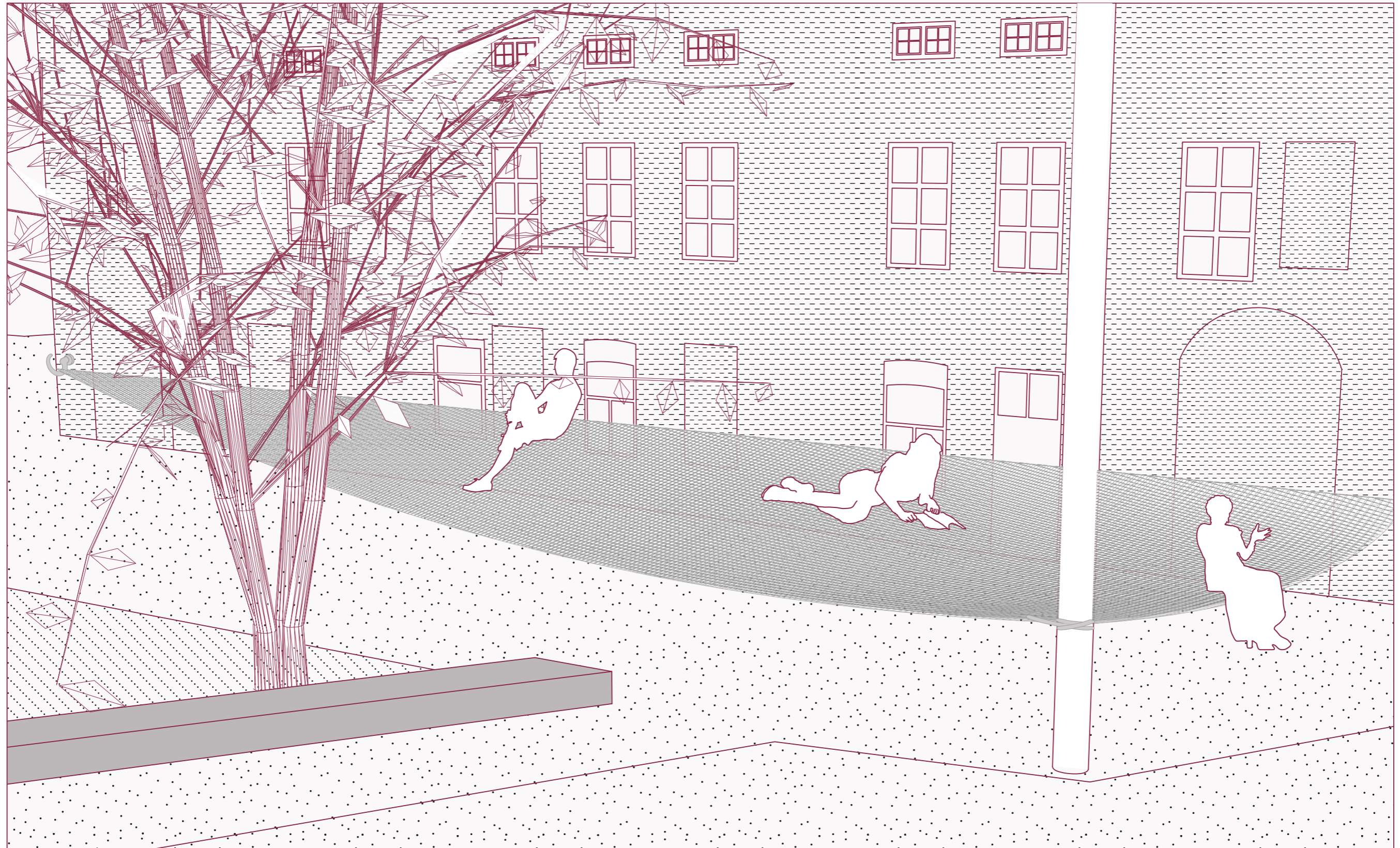
Material swatch	Crochet stitches	Attachment points
		
Techniques: <i>Freeform mesh, increase & decrease</i>		

Increase & decrease, freeform mesh



Sit

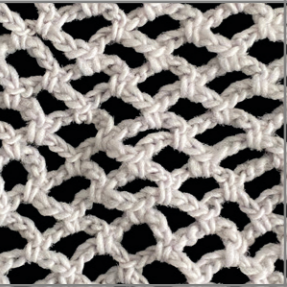
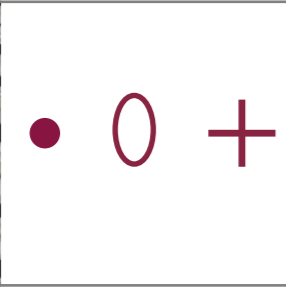
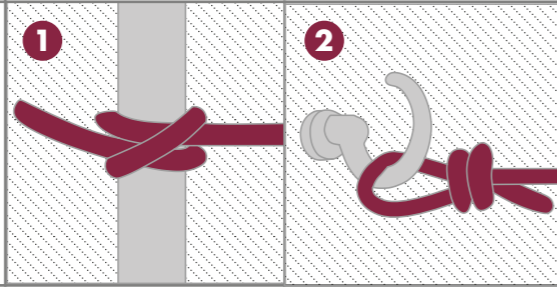
The architectural use *Sit* is represented with a hanging mat that overlooks the skateboard park. It is attached to the building that houses a café, and can be seen as an extension to their seating area. This part of the area is a bit secluded and calmer, which fits perfectly for this architectural use. You can sit or lay on the mat to relax.

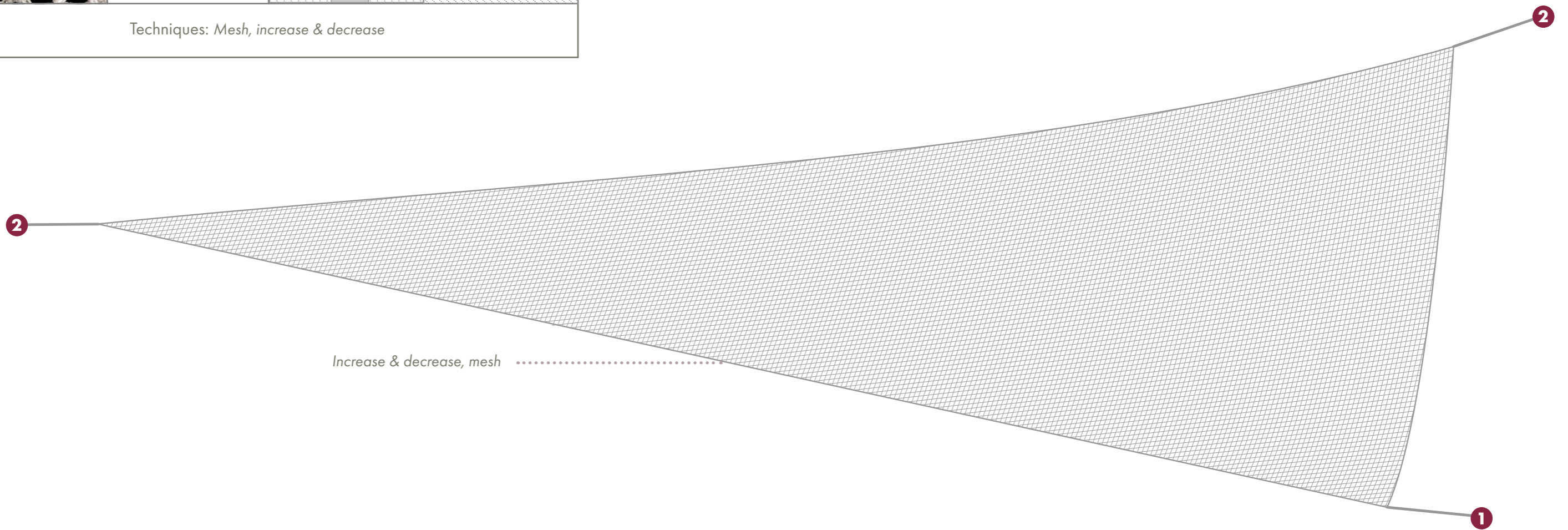


Sit - parts

The hanging mat is crocheted with the mesh stitch into a triangular shape, which requires the increase and decrease technique. The fabric is attached to the street light with a clove hitch knot (1) and the facade with 2 slip knots around a hook (2).

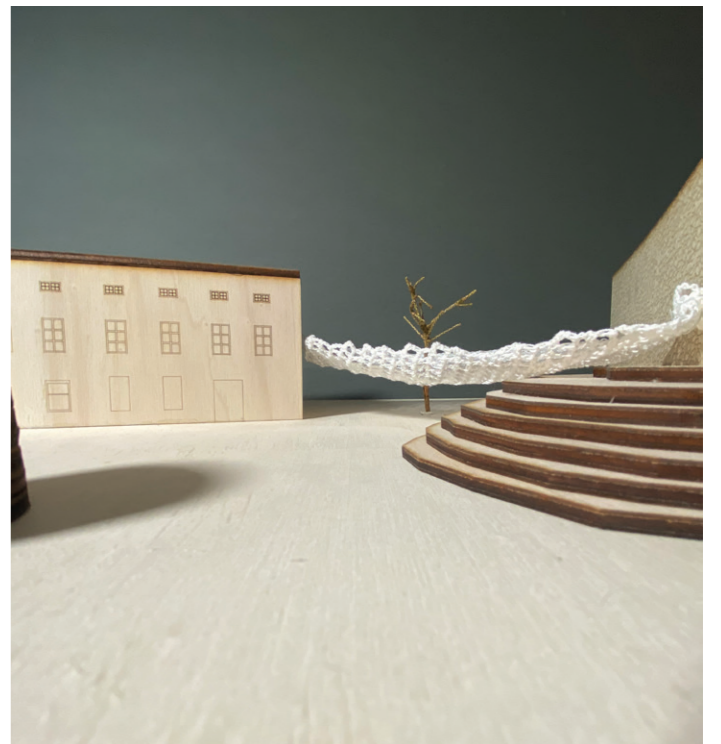
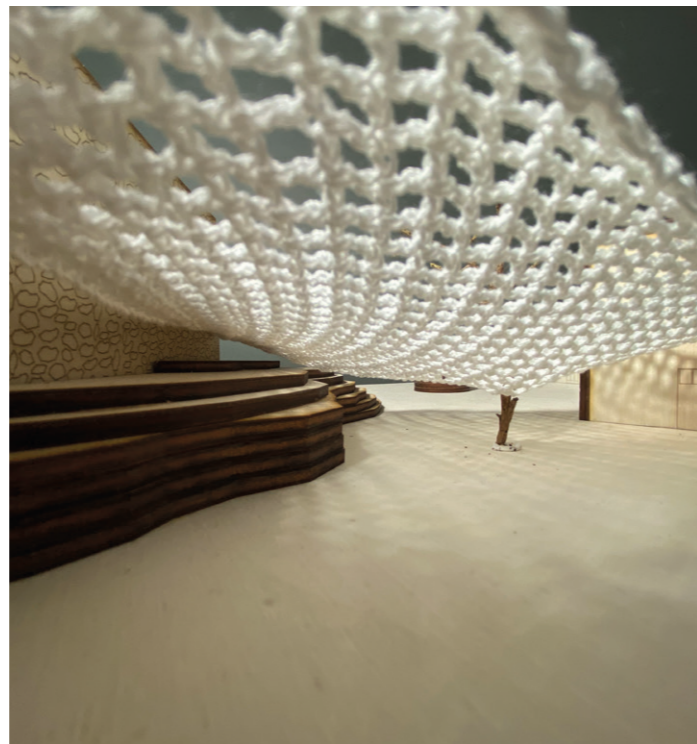
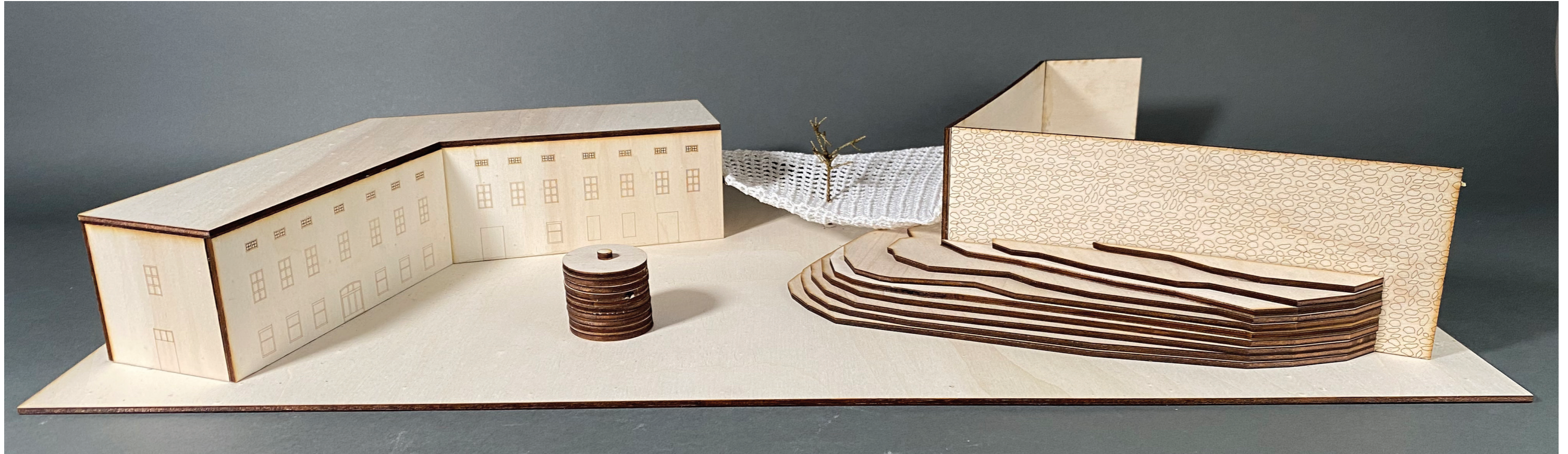
Toolbox:

Material swatch	Crochet stitches	Attachment points
		
<p>Techniques: Mesh, increase & decrease</p>		



Physical model

A part of the site was built in a physical model in the scale 1:100. The elevated enclosing plane was crocheted according to scale.



Discussion & conclusions

Crocheting is a craft that mixes mindfulness and creativity. My interest for this craft grew during last year, and it is something I do when I want to relax, and have a creative outlet to do varied projects. Connecting this craft with architecture was a challenge at first, as it has not been done extensively before. I only found a few references connecting these themes together, which was difficult at first. However, with time the project grew and developed, and the lack of direct references was also a blessing in disguise, as I found myself being more free and creative when creating the scope and design in this thesis.

The scope of connecting ephemeral architecture, crochet, in between spaces and modularity works, as these themes complement each other. Crocheting creates lightweight structures that are easy to assemble, disassemble and move, which is important for the aspect of ephemeral architecture being temporary. The best setting for ephemeral architecture is in between spaces in the city, as they often need revitalization. Crochet chart patterns are a tool for modularity, as they are clear and illustrative instructions of a crocheted structure. This presents a new recipe for tensile architecture, as the design of crocheted tensile structures are explained in a thorough way, as a handbook for construction, for it to be built in any given context. In this thesis, the techniques and the final design proposal have been presented with this language, which has been a great tool for explanation and to break down the structure clearly. I think this tool has great potential and can be discovered further.

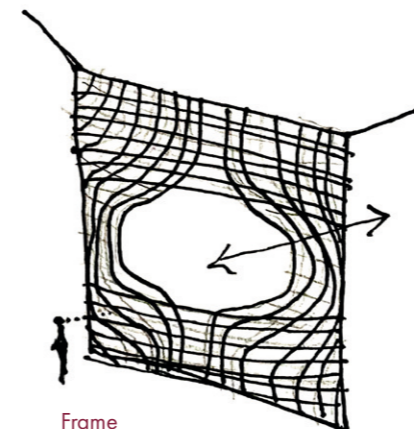
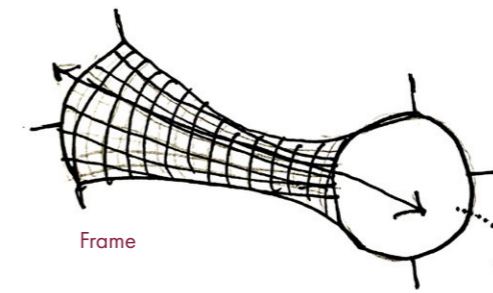
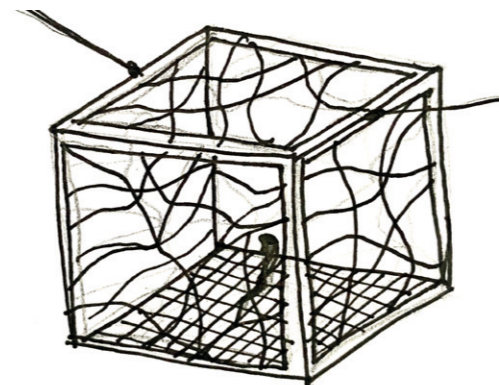
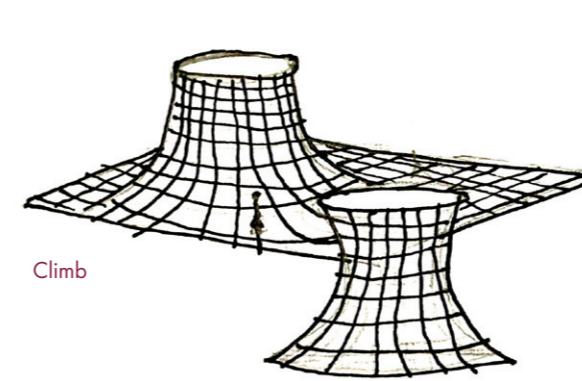
The thesis presents the material properties of crochet with the different stitches and techniques. There is a vast range of crochet techniques, and the most relevant ones for this thesis have been presented in chapter 2. This sets a foundation for the design proposal, as after analyzing each technique, it is more clear which one fits which design the best.

The site was then analyzed to find which ephemeral architectural uses can be added to the area to revitalize and activate it using crochet. These were then compiled and analyzed in relation to the techniques to find different compatibilities. The design proposal combines the outcome from each chapter, and therefore fulfills the aim of the thesis. The design proposal is seen as a playful experience park to revitalize Esperantoplatsen.

Esperantoplatsen is a fitting site for this project, due to its defined in between spaces and attachment points. I did not want to add or tweak the site, but use what is already there. The crocheted pieces should be hung up and suspended easily. There are four different additions, representing each architectural use, which activates the site and answers the research question of "How can crocheting be used to create ephemeral and modular architecture that is interactive for the user and revitalize in between spaces in the city?". The architectural additions activate the user physically and make them use different human senses.

Due to lack of time, there was no opportunity to create a detailed crochet chart pattern for each design in the design proposal. I also wish to have built a part of it in full scale to capture the real life experience. The perspectives and smaller model is a replacement for that.

This process has been both insightful and fun. I have learned a lot about this craft and how to convert a simple idea to a full project, with an iterative process. I hope this thesis will be seen as a discussion piece for a new materiality, how to use crochet charts as a recipe for tensile structures, how to activate an urban space and the challenging of the permanence of architecture.



Early sketches

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Education

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Matter, space, structure 1
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Architecture consultant at Chalmers Teknologkonsulter

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2021-2022

References

Aerotrope. (n.d.). *Ark Nova*.
<https://www.aerotrope.com/what-we-do/art/ark-nova.html>

ArchDaily. (2023). *Ephemeral Architecture: The Latest Architecture and News*.
<https://www.archdaily.com/tag/ephemeral-architecture>

Arisya, K., Suryantini, R. (2021). *Modularity in Design for Disassembly (DfD): Exploring the Strategy for a Better Sustainable Architecture*. IOP Conf. Ser.: Earth Environ. Sci. 738 012024
<https://iopscience.iop.org/article/10.1088/1755-1315/738/1/012024/pdf>

Baurmann, G. (n.d.). *Gisela Baurmann's Hyperstitch*.
<https://architecture.pratt.edu/articles/hyperstitch>

Borges Ferreira, D. (2024). *Ephemeral Architectures: Engaging Communities through Temporary Structures*.
https://www.archdaily.com/1019356/ephemeral-architectures-engaging-communities-through-temporary-structures?ad_campaign=normal-tag

Enia, M., Martella, F. (2020). *Architecture beyond permanence. Temporariness in 21st century urban architecture*. EAAE – ARCC INTERNATIONAL CONFERENCE. Doi: <http://dx.doi.org/10.4995/EAAE-ARCC-IC-2020.2020.XXXX>
https://www.researchgate.net/publication/345904547_Architecture_beyond_permanence_Temporariness_in_21st_century_urban_architecture

Göteborgs Esperantoförening. (n.d.). *Vad är Esperanto?*
<https://www.esperanto-gbg.org/>

Göteborgs Stad. (n.d.). *Esperantoplatsen*.
<https://goteborg.se/wps/portal/start/foretag-och-organisationer/tillstand-och-regler/ordna-evenemang-och-tavlingar/hitta-platser-for-evenemang?id=5077>

Jobson, C. (2012). *Crochet playgrounds by Toshiko Horiuchi MacAdam*.
<https://www.thisiscolossal.com/2012/07/crochet-playgrounds-by-toshiko-horiuchi-macadam/>

Marks, R. (1997). *History of Crochet*.
<https://www.crochet.org/page/CrochetHistory>

Myers, L. (2019). *Estúdio chão utilizes scaffolding to build temporary structures for festival in rio de janeiro*.
<https://www.designboom.com/architecture/estudio-chao-temporary-structure-festival-rio-de-janeiro-brazil-08-09-2019/>

Niederholzer, T. (2024). *Soft Architectures for Harsh Environments*.
<https://www.exparch.at/2024/02/lv848188-soft-architectures-for-harsh-environments/>

Numen. (2011). *Net Hasselt*.
<https://numen.eu/installations/net/hasselt/>

Figures:

Ballering, K. (2023). *How to read any crochet pattern chart or diagrams* [Diagram]. <https://haakmaarraak.nl/how-to-read-a-crochet-pattern-chart>

Coppom, J. (2024). *How To Read Crochet Charts + 25 Free Pattern Diagrams* [Diagram]. <https://makeanddocrew.com/crochet-patterns-diagram/>

Haas, R. (2022). *Crochet Symbols and Charts: An In-Depth Guide (With Cheatsheets)* [Diagram]. <https://crochetkim.com/crochet-symbols-charts/>

Lantmäteriet. (n.d.). *Min karta (e-tjänst)* [Map]. <https://minkarta.lantmateriet.se/>