

**EMBODYING ENVIRONMENTAL LEGACY**

WALKING IN E-TEXTILES AND THOUGHTS FROM MY BASEMENT

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**Abstract**

**EMBODYING ENVIRONMENTAL LEGACY**

WALKING IN E-TEXTILES AND THOUGHTS FROM MY BASEMENT

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A creative endeavor that explores experience in place of post-industrial landscapes.  
I designed and created an e-textile piece, "Embodying Environmental Landscape", in the hopes to dive deeper into site.

**EMBODYING  
ENVIRONMENTAL  
LEGACY**

: WALKING IN E-TEXTILES AND  
THOUGHTS FROM MY BASEMENT.

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**INTRO**  
LAND + BODY  
SITE  
E-TEXTILES  
REFLECTION

FIG. 1: CONNECTION

As I write this, it has been six months since schools across the country have shut down. The University of Washington was the first university to start what would become a nation-wide trend of schools closing campuses and moving online as they tried to grasp the realities of the pandemic. Feeling whiplashed and shocked, I sit here now, in my basement, holding the pieces of my last year together. I grieved, raged, sat, marched, and crafted, but most importantly, like so many others, I walked. As the pandemic continued to claim some lives and shake up others, I continued walking. I began connecting my research and design of e-textiles to this daily practice. Movement in space is required for e-textile to work as an art piece. Walking produces the results of movement that makes this e-textile a tactile art experience. This thesis intends to explore the concept of walking while wearing e-textiles as an approach to exploring landscape. It also explores the nuances of digital art and its ability to underscore the importance of personal encounters with post-industrial landscapes. Yet, my real intent for this thesis was

to walk and exist in my making, therefore living the embodied experience of place.

So here I have been in my basement putting these nodes together and connecting them to myself to go out walking and attend to my embodied experience. This is a thesis experience unique to our current age. Usually, my cohort and I would be forming ideas and writing our thesis within Gould Hall, our home of the last three years. Instead, we've been squeezed out of our academic hives, and sent into our respective residences. Thus, as an alternative, I walked and walked outside my basement, thinking, always returning to my basement. Ultimately my basement bedroom has been the start and finish of each journey. There were no two different sites that I began or ended with, and that is how I looked at walking - not a means to an end, but as a means unto itself, a meandering mode of embodiment in the landscape. This was my process, which Delueze & Boyman (2001) describe as a dynamic state of "between-moments" (p. 29). I emphasize this state of "between-moments" because walking is ultimately about connection to

spaces, the betweenness that binds each place to the next – and thus it is a moment of importance in and of itself. Paths, pilgrimages, routes, and maps exist because of walking (Solnit, 2000). Walking itself becomes a mode of shifting and modifying landscape through desire. As shifting and modifying is formed by body, how we shift and modify is informed by landscape. In this way, the body can transport itself though the landscape with ease. When embracing the ideology of between moments there is a sense of importance to flow, movement, and connection. Walking is a tool to rationalize our changing surroundings, allowing us to understand our environment. Therefore, these "between-moments," and the flux that characterizes them, are essential to understanding my approach to this thesis.

Using the experience of walking in an attempt to better understand the world around me, I began to explore the capacity of physical engagement within the post-industrial landscape. I became interested in walking, as a means of coping with the pandemic, and through that practice, I found another way to experience

the world, finding clues of human existence—a house with lights on inside, the design of a sewer grate suggesting an act of creative city making. The daily practice of walking began to infuse meaning into my work with e-textiles, which are, according to Sabine Seymour (2008) a "textile substrate that incorporates capabilities of sensing (biometric or external), communication (usually wireless), power transmission, and interconnection technology to connect sensors and microprocessors to allow such sensors or things such as information processing devices to be networked together within a fabric" (p 21). To me, e-textiles are a form of melding hardware and soft materials to raise the consciousness of embodied experiences of place. Used while walking, e-textiles can be a tool of elevating the unseen aspects of existence, such as the relationship between the body and landscape, which is amplified by sound. I became entranced by e-textiles as a medium as the possibilities felt endless. I then decided I wanted to create an intentional art piece that amplifies the connection of land and body through movement within the

landscape and that specifically reflects on the connection to post-industrial landscapes that are our current urban and capitalist legacy.

This e-textile design, which I call the “Embodiment of Environmental Legacy” aims to amplify systems thinking while binding the body to land through walking. The use of electronics in textiles has been mainly utilized by the DIY art scene and is not typically employed in landscape architecture. Landscape Architecture pushes the need for “softening” the urban landscape (i.e. emotional mapping, natural materials, re-introducing gradients to waterfronts, etc) for a sense of a more pliable and palatable experience. E-textiles are like a physical representation of that softening and, ultimately offer an untapped resource to explore site artistically. Therefore, I wanted to traverse the uncharted relationship between e-textiles and landscape architecture within this thesis.

While stitching the e-textile, I envisioned a post-industrial urban landscape as a perfect challenge for utilizing the piece. In *The Mushroom at the End of the World; On the Possibility of*

*Life in Capitalist Ruins* Anna Tsing, describes a capitalist ruin as a landscape that recognizes the damage wrought by the “history of the human concentration of wealth through making both humans and non-humans into resources for investment.” Tsing ultimately identifies a capitalist ruin as “spaces of abandonment for asset production” (2015, p. i), which is exactly what a post-industrial site embodies. Walking in e-textiles became a new meaningful journey to understand “capitalist ruins.” I started with a set intention to explore a space that has been entirely altered by production and industry. I wanted a sense of discovery to explore objects within that landscape by wearing my e-textiles. The lure was intensified by the idea of finding hidden aspects of “what once was” (Tsing, p. x) peeking out at the edge of the waterfront. The site I selected for my exploration of landscape while wearing my e-textiles is a superfund site, the Duwamish River’s industrial waterfront. The river bears witness to the transformation of landscape as a result of America’s focus on shaping nature into a tool of capitalistic efficiency. By straightening

the river, the main function of the Duwamish River became more about production rather than the local ecology. I wanted to explore these capitalist ruins to suspend my bias on what landscape should be.

Engaging with creating an e-textile while immersed in walking could offer a powerful tool to interact in the world around us. To explore this idea I asked these three questions in this thesis project:

1. How can movement, like walking, engage users in a deeper understanding of the nuances inherent in capitalistic ruins?
2. How can an embodied e-textiles experience challenge or complement my assumptions of capitalist ruins?
3. How can the embodied knowledge enrich the e-textile experience?

The final product of this thesis is ultimately the built e-textile that I created, in which movement is amplified in a creative output. The creative output here is the mapped readings of data that have been strung into lyrical, digital sounds. While walking my selected site along the Duwamish in my e-textile garment, the electrodes from the belt, glove, and

fabric speaker I created and wore produced sounds in relation to the capacitive sensor which detects any change in the electrical field through proximity to objects in the environment, while also detecting varying levels of moisture. These elements that hold electric field properties allows for a capacitor exchange in the landscape, additionally between the sensor and my hand, which is heard through the speaker. All in hopes to hear the process of place-making through walking in the landscape.

From the beginning, walking determined the design of this e-textile prototype. Walking sews each significant moment to the next, much like the parts of the e-textile garment I created. The general aspiration was to showcase this, to form an e-textile that worked best as a medium of discovery and flux. For this thesis I went on multiple walks on the selected site on the Duwamish River with and without the functioning e-textile. This was an endeavor of explorations. My intent then and now is to build an artistic inquiry of movement on an industrial riverfront.



INTRO  
**LAND + BODY**  
SITE  
E-TEXTILES  
REFLECTION

FIG. 2: VIEW OUT TO THE RIVER

Walking is made visible by built forms designed to accommodate bodies in motion, i.e. trails, paths, sidewalks. These traces showcase the intent of "knowing the world through the body and the body through the world" (Solnit, p 28). Embodiment, according to Justin Smith (2017), is "the state of being embodied [that] requires, first, a body to be in... [it is] the more basic belief that a person is not synonymous with his or her body but, instead, has a body." (2017, p 1). The body is an essential ingredient that grounds the idea of embodiment. My experience of walking was indeed to think and to process the world around me within and through my body. This chapter provides tools and terms that influenced my understanding of walking and embodying in e-textiles within capitalistic ruins.

### philosophy of place

To begin, I will expound on my approach to place in conducting this exploration. I used *The Fate of Place; A Philosophical History* by Edward S. Casey and *The Introduction of Place*

by Tim Cresswell to explore place's philosophical meanings. Both references thoroughly discuss the human experience of place. Place is a linking of human experience and landscape, thus within the landscape, there exists many places, though not all are recognizable to all people. The body existing in space is an initial first step in forming place.

In addition, the definition of place by philosopher Gilles Deleuze, and particularly his notion of "smooth space" was essential to my understanding landscapes that are what Anna Tsing calls "capitalist ruins." It also influenced my walking perspective. Smooth spaces is in opposition from what Deleuze calls "striated spaces.". Smooth space and striated spaces are a conceptual pair that reveal a tension between movement and sedentariness and both are a way to rethink space as "a complex mixture between nomadic forces and sedentary captures" (Lysen and Pisters, 2012, p. 1). Striated spaces are fixed, homogenous, and subject to "linear striation by precise path" (Casey, 1997, p. 303). In comparison, smooth spaces can be found on the outskirts



FIG. 3: THESIS POSTER

of order. For Deleuze, "smooth space" is mainly about movement and nomadic forces. It conjures up meandering and drifting inside regions.

Smooth space is different from moving from a fixed point to point with cardinal directions. There are no defined boundaries. As Casey points out, "To inhabit such a region is not merely to be at a place, much less at a point in it (there are no points in smooth space)" (1997, p 304). Smooth can be interchanged with nomadic, giving way to "place-as-region". Deleuze maintains that place and region merge, that the body exists through the whole, "for place itself is everywhere" (1997, p. 305). This sense of irregularity felt similar to the idea of "capitalist ruins", exist only in the breaking down of defined spaces.

This project was also influenced by the writings of Edmond Husserl, a philosopher who established the school of phenomenology. According to Stanford's Encyclopedia of Philosophy, "Phenomenology is the study of structures of consciousness as experienced from the first-person point of view". Essentially, phenomenology is based on the lived experience

of the embodied self. As such, it includes the consideration of the connection between body and landscape.

One of the questions that are explored in phenomenology is how does the living body and living place unite? Hummel suggests that walking is the key to linking body and place (Casey, 1997). Actual movement is the unity of body parts that make up a "total organism," creating a kinesthetic feeling. Kinesthetic flow occurs when spatial movements intertwine with the actualization of our inner organs//body. Casey writes that "humans that experience themselves walking", have an opportunity for kinesthetic flow connecting hands, eyes, and limbs that "parallel to the outer-spatial units of these parts" (1997, p 224). The phenomenality of the lived body is not limited by kinesthetic feeling, but knowledge of the place that it is so intimately attached. (Casey, 1997, p 232) The multiple experiences of site through virtue of the lived body provide phenomenal experiences. "Being here" becomes the outcome of an immediate place with a living body while also moving towards different versions of "theres".

Walking is an example of "being here" in various fixed spots. If one is walking, they experience bodily movement and experience oneself as a "stable null-object" all at once (Casey, p 225).

Maurice Merleau-Ponty in *Phenomenology of Perception*, maintains that our lived embodied experience is how we receive access to the "primary world" (Casey, 1997, p 229). According to Merleau-Ponty, the movement of the body is considered "productive of space." For space to be elevated in our consciousness, the body cannot be stagnant; it must be in motion. The experience of motion, according to Merleau-Ponty, gives us entry to the known world.

An interest in movement drew me to process. Process became vital for my interpretation of understanding the link between place and experience. As I have stated in the introduction, the state of "between-moments" is essential in the formation of my approach. "Between-moments" emphasize the importance of movement, flow, and connections. David Woodruff Smith in *Mind Worlds*, reports on how another philosopher, Alfred Whitehead, shaped the idea

of "becoming" as a product of existing through process and flux (2004, p.212). Smith refers to "becoming" as a key element to establishing his fundamental ontology; that is being is to become. "Becoming" is identified as a process of many entities morphing into one actual entity. The perception of becoming embraces process and breaks up the confines of static design and, in fact, encouraged my approach to the final e-textile product. I found "becoming" to be an inspiration for using sound to indicate the unity of site and body in my e-textile creation. A focus on process and "between-moments" revealed a need for the e-textiles to be versatile to embrace the spontaneous and novel encounters that lay awaiting as I walked the landscape.

My reliance on Casey's and other phenomenologist's work helped me to appreciate varying perspectives on place that informed my own approach in this thesis. Place has been described as open, closed, transitional and physical, smooth and striated. Walking gives way to the potential of kinesthetic flow, to experience intimacy with place. Walking allows for an



FIG. 4: THE SITUATIONIST'S MAP

opportunity to encounter smooth space. Walking leads to increased familiarity and intelligible place. It has the potential for creative pursuit in movement. It informed the final design for the e-textiles that helped me to bind land and body

### psychogeography + psychogeophysics

Psychogeography, a term coined by Guy Debord, is a field of inquiry that: "could set for itself the study of the precise laws and specific effects of the geographical environment, consciously organized or not, on the emotions and behavior of individuals. The adjective psychogeographical, retaining a rather pleasing vagueness, can thus be applied to the findings arrived at by this type of investigation, to their influence on human feelings, and even more generally to any situation or conduct that seems to reflect the same spirit of discovery." (Coverley, 2018, p 89).

The intent is to drift or aimlessly stroll, collecting and combining subjective and objective values along the lines of Debord's philosophy.

The drift is a way to create "playful-constructive behavior" and monitor "emotional zones". Using this process I hoped to create a new form of cartography and disregard the traditional practice of the tourist (Coverley, 2018, p 90). To drift in Debord's sense is not a mere stroll, but a way to explore spontaneous preferences within routes of the urban environment. The intent behind drift was not to take the user out of the urban landscape, but rather to offer a conceptual tool of collective re-thinking of the built environment (Sadler, 2001, p 78). Pushing this idea of drift, Debord published his own version of a psychogeography map, where he cut up sections of Paris into nine pieces and users were allowed to drift into whichever emotion they chose.

Working off psychogeography, a research group//art collective called Topology of a Future conducted a study at Transmediale.10 Festival in Berlin in 2010. This is where the public first sees the word psychogeophysics. According to Martin Howse, an artist and research team member, Psychogeophysics is a novel interdisciplinary framework that "equally encompasses

archaeological geophysics, with measurement of such properties allowing for the mapping techniques of particle/wave detection and data forensics" (<http://www.psychogeophysics.org/wiki/doku.php?id=wikipedia>). This technique is used to document the unseen aspects of exploring the landscape, similar to the psychogeography form of mapping but with an additional layer of consideration of how the human condition is shaped by the entire earth – including understanding time scale on the global epochal level (London Psychogeophysics Summit, 2010 ). Another key difference between psychogeography and psychogeophysics is a reliance on the technique of gathering data with the use of technology. For example, a psychogeophysics form of documenting the internal aspect of the experience of walking in the landscape is to monitor that experience through e-textile technology.

There are two methodologies to the practice of psychogeophysics: detection of energy and the pairing of an excitation of that energy with subsequent measurement. These are

important to explain because it heavily influenced the prototype's for my final design of the e-textile garment I created for this thesis project. My output of data needed to display both internal and external experience of the landscape.

A creative precedent for this thesis is Martin Howse's Psychogeophysics Walker(see Fig. 6), a device he built using a disabled or aged person's walker that provides a mobile platform for both urban and field exploration. This device incorporates a range of sensors that detect skin resistance, skin temperature, blood flow, and breathing patterns, which are typical means of measuring a person's biological/emotional states, while also capturing GPS, magnetic field, high and low-frequency signals, temperature, soil resistance all mounted on top of a walker. As a result, the walker can log both the user's data, and data from the local environment producing a series of maps of walked locations that reveal correlations between psyche and geophysical environment (<http://www.psychogeophysics.org/wiki/doku.php?id=walker>).

Inspired by this, I sought to experiment



FIG. 5: PSYCHOGEOPHYSICS WALKER

with creating a data-based understanding of the emotional state of the user and the physical environment while walking in my e-textile garments. I was curious to explore and express measures that "are predictably hidden in this world, but yet there is no place for them to be hidden" (Howse, 20125, interview). The making of e-textiles reveals how body and landscape are intertwined, illuminating the hidden aspects of the known world. Connecting the physical mode of walking in site and the internal dialogue of the living body, allows the pursuit of documenting Debord's notions of smooth and striated space. These precedences along with the key literature I reviewed made way for an informed process of design and experience of site.



INTRO  
LAND + BODY  
**SITE**  
E-TEXTILES  
REFLECTION

FIG. 6: SITE

This chapter explains my understanding of Boeing Plant 2, the site I selected for this thesis project, through historical research, mapping, and qualitative descriptions. I sought out a site that had been wounded by industrial progress and that carries the vastness of loss and disturbance. The intention is to explore place experience with my e-textile design in surroundings with varying degrees of human interventions. My intrigue of the lower Duwamish River began with the region's industrial legacy. I began to look for a specific site that best suited the idea of "environmental legacy," particularly one that represented capitalist ruins. In the end, I chose a hot spot on the former Boeing Plant 2, which sits on the Lower Duwamish River, as my site. To indicate the site's layered industrial history, I will provide a brief history of the Lower Duwamish River to illustrate the notion of the "collective site". This term stems from Eric Wagner's collection of essays, *The Once and Future River*, and it refers to the ways that a site is a layered collection of elements and histories that reveals juxtapositions of the past and present.. This notion of collective

site helped informed the decision to choose to explore Boeing Plant 2. This site is clearly a layered collection of elements and histories where the past is overlaid onto its industrial present. This post-industrial landscape is also the best representation of a "capitalist ruin". In the Boeing Plant 2 section I describe my personal documented encounter with this site. I explored Boeing Plant 2 as intrinsic to fostering "becoming" with and within e-textiles.

#### **collective site**

Within the lower Duwamish River there is a 5-mile strip that is designated as a superfund site, because of the levels of toxic waste and poor regulation that allowed illegal dumping. A superfund site is defined by the U.S. Environmental Protection Agency as a polluted location requiring a long-term response to clean up hazardous material contaminations. As such, they are known to be among the most toxic sites in the United States (<https://www.epa.gov/superfund/what-superfund>).

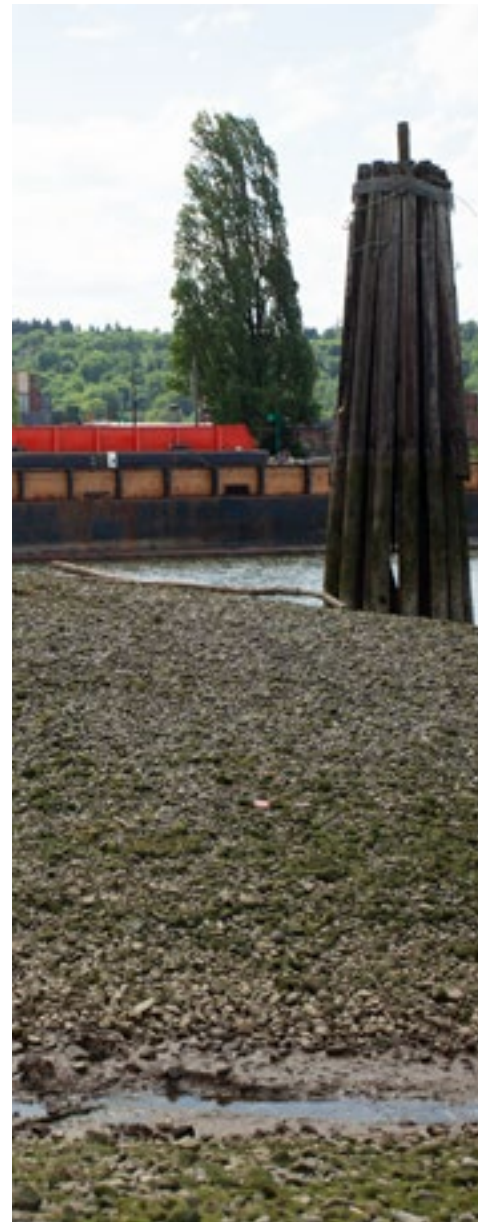


FIG. 7: SITE WETLAND

The mistreatment of the Lower Duwamish River didn't start with toxic dumping, but rather it began with the straightening of the river in 1913. This engineering project was conducted under the supervision Hiram M Chittenden, a major of the US Army Corps of Engineers. According to Chittendon in the 1911 Argus:

"digging the enlarged Duwamish channel will be to solve definitely the drainage and reclamation problems around the Lake and in the lower Duwamish valley. The uncovering of this belt of land around the lakes affords a rare opportunity to protect the scenic beauty of the lake shores and at the same time facilitate industrial growth in situations adapted to it" (Wagner, pg 24).

Seattleites supported the straightening of the river and created the Duwamish Commercial Waterway District. In the fall of 1913, the dredging began. Leftover mud and earth from the regrading was used to form and fill what are now Beacon Hill and Denny Hill. By the end of it all, twenty

million cubic yards of sediment, clay, and mud was removed (Wagner, pg 24). The created edge between water and land, gentle and seasonal in its original state, is now deep and violent.

Through my research, I started to understand the relationship between Boeing and the lower Duwamish River. Eric Wagner (2010) wrote "that every polluted river has a corporate sponsor,"(p. 30) and Boeing stands as the sponsor for the Duwamish River. In 1910, William Boeing bought Heath's Shipyard on the Duwamish River for supposedly ten dollars. ([https://www.kingcounty.gov/~media/services/home-property/historic-preservation/documents/resources/RedBarn\\_LandmarkForm\\_Final.ashx?la=en](https://www.kingcounty.gov/~media/services/home-property/historic-preservation/documents/resources/RedBarn_LandmarkForm_Final.ashx?la=en)). During WW2, Boeing built B-17s Flying Fortress, a bomber plane critical to winning the war in Europe. Most of these planes were built inside Boeing Plant 2 (Wagner, 2016, pg 27). As a continuous cycle of bombers was produced, so was a stream of heavy metals discharged directly into the river, along with numerous combined sewer outlets along the Duwamish River waterfront.

Admittedly there are various industry offenders dumping toxic waste into the Duwamish River, yet Boeing can be considered the worst. Boeing was such a flagrant contributor of PCBs and heavy metals that, in 2000, Boeing was designated by the EPA as one of the four responsible parties. These parties - Boeing, King County, the city of Seattle, and the Port of Seattle - comprised of The Lower Duwamish Waterway Group. The intent of the final clean-up was to reduce the PCB levels over the next two decades by 90 percent (Wagner p 33).

In 2001, the EPA announced the lower Duwamish River as a Superfund site. The use of the term Superfund suggests to me a sense of environmental doom. Since that declaration, the Duwamish River remains one of the most polluted body of waters in the United States. The Superfund area spans over 412 acres of the Lower Duwamish River, while the clean-up plan committed to working on only 177 acres. When designating and squabbling over the final clean-up plan, called the "Record of Decision", these areas were considered too poisonous to

ignore. Thus, they were claimed as Early Action Areas. There are five such areas (also identified as "hot spots") on the Duwamish River. The Plant 2 building has been torn down but the site is still regarded as the worst of the five hot spots. During the settlement with the EPA, Boeing agreed to "restore" five-acres of the shoreline. Plant 2 was part of that agreement.

#### **boeing plant 2**

Part of the restoration area of Plant 2 is deemed walkable at low tide and for that reason I decided this area would be the best site to visit regularly. The clean-up of Boeing Plant 2, which involved removing 163,000 cubic yards of sediment (mud) and replacing it with clean soil, ended in 2015. (<https://www.epa.gov/hwcorrectiveactionsites/hazardous-waste-cleanup-boeing-plant-2-tukwila-washington>) Boeing agreed to also include a one-mile strip of wetland with native ecology to increase the survival of juvenile salmon. I found this part of the site intriguing and wanted to see this restored



FIG. 8: CONSTRUCTION ON THE RIVER

wetland next to a parking lot. This juxtaposition of industry next to ecological restoration embodies the idea of a capitalist ruin.

During my first visit, there were clear indications of "no visitors welcomed" on the site. Nothing is inviting about asphalt, loud construction noises, nor the warning signs, fences, and riprap that greets you upon first entering the industrial district. Access to the waterfront is somewhat obtuse and proved rather tricky. I wasn't quite sure what was considered safe and public. In my observations, the site was disjointed and scattered due to the obstacles, such as fences, blackberry thorns, dead ends, etc., that kept emerging. Walking in this area seemed discouraging, difficult, and confusing, yet walking offered an opportunity to understand the nuances, and inspired a level of curiosity. Upon my first arrival, before the COVID 19 shutdown announcement, I noticed that there were opportunistic plants and a dirt footpath that contrasted with the surroundings; the outskirts of the parking lot exuded a lush greenness. Yet, there was no visible access to this footpath. I

followed alongside the fence. Ultimately, I could not continue as the footpath ended abruptly at a fence. I was now on the west side of the parking lot of Boeing's office buildings. Looking toward the river to my right, there was an immersion of plants, grasses that came up to my chin, trees that hid the water, and to my left was asphalt, plus a few cars. I began my way into the tall grass where previous users had made desire lines to enter the site's greener side. As I entered, the parking lot fell farther away, yet the noises of the site kept me aware of the heavy industry. The sounds of construction and development were almost always present in the lower Duwamish Area.

Within this greener path, there appeared some pavement that led to the Duwamish River. As I walked, remembering to "drift", I wandered off to explore the edges of the site. It had been intentionally designed but was now overgrown. At the end of the pavement was the restoration area, which was strangely surrounded by seeded grass and a gate. The fence ended at the water's edge; therefore I could only enter at low tide. Teetering around the edge of the fence, I walked on the soft

edge of the restored area. This area had scattered logs with chains around them, I assume so they wouldn't float away. There was also a grid of sticks peeking up from sediment and pebbles, and a nice stream that flows through it to give salmon a place to rest. The boundary is loose due to the tide and the scene shifts depending on the water level.

Each site visit shifted my perspective; and with each new experience there was a sense of "becoming". Not every visit included my wearing the completed e-textiles piece, which I called "Embodying Environmental Legacy." As I was designing the e-textile, I would visit the site for aesthetic inspiration, all while building the relationship to site through process. There was a shared process between the site and me. When wearing an e-textile, the output is sound; therefore, I was responding and listening to the unfolding events at the site as I walked to and fro. After the shutdown due to the pandemic, there was a silence in the area that was unique. When visiting the site from there on, I could hear myself more loudly in such a quiet context.

Once I wore the completed the e-textiles, I realized the sound of the working piece now pierced the serenity. I wanted to explore more through touching, digging, crawling, and opening whatever felt accessible. The site became a playground of exploration for my prototyped e-textile. I spontaneously moved and reacted to the surroundings. These walks, both with and without e-textiles, expanded the possibilities of experience.

The e-textile piece itself piqued my interest and curiosity to the objects and ecology of the site. I wanted to hear what objects would sound like through touch in alignment with my own body sound. The objects had the power to alter the sound experience and I could alter the objects. The site, I would argue, held the agency of influencing the experience. The landscape held a direct significance to my movement, in and out of e-textiles. This revealed dynamic processes to me that allowed action and reaction.

Again, the state of flux, of both the site and my movement through it, was vital to "becoming"; each venture had no definitive or preplanned

outcome. Simply the act of embracing flux brings such fulfillment. I walked and wore my e-textiles simply because it brought fulfillment, not because of an ultimate result. This project focuses on the creative precedent over progress, points, and paths at Boeing's Plant 2. Rather, I was inspired by the unpredictable nature of site, movement, and the intent of creative fulfillment.

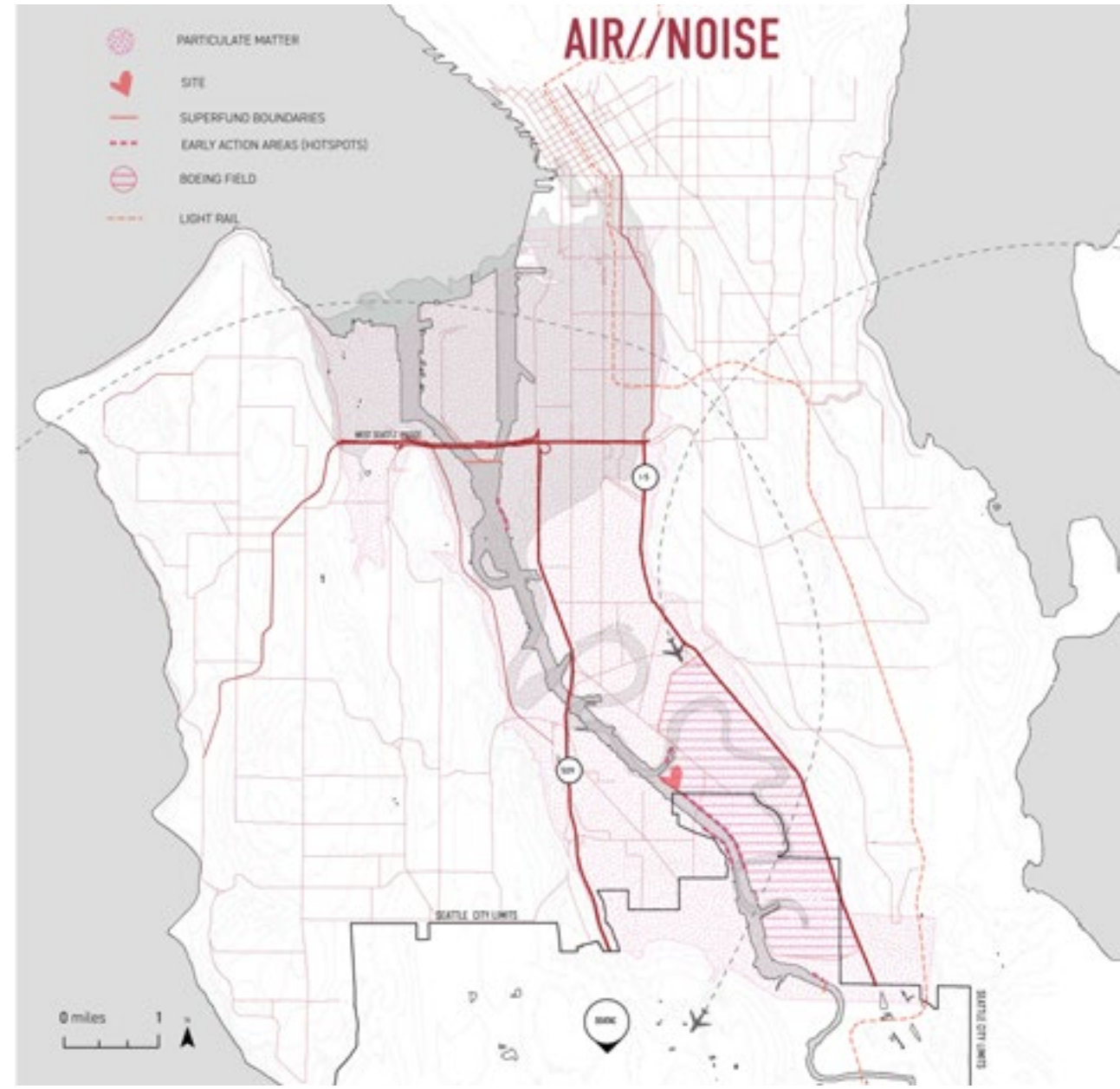


FIG. 9: MAP 1

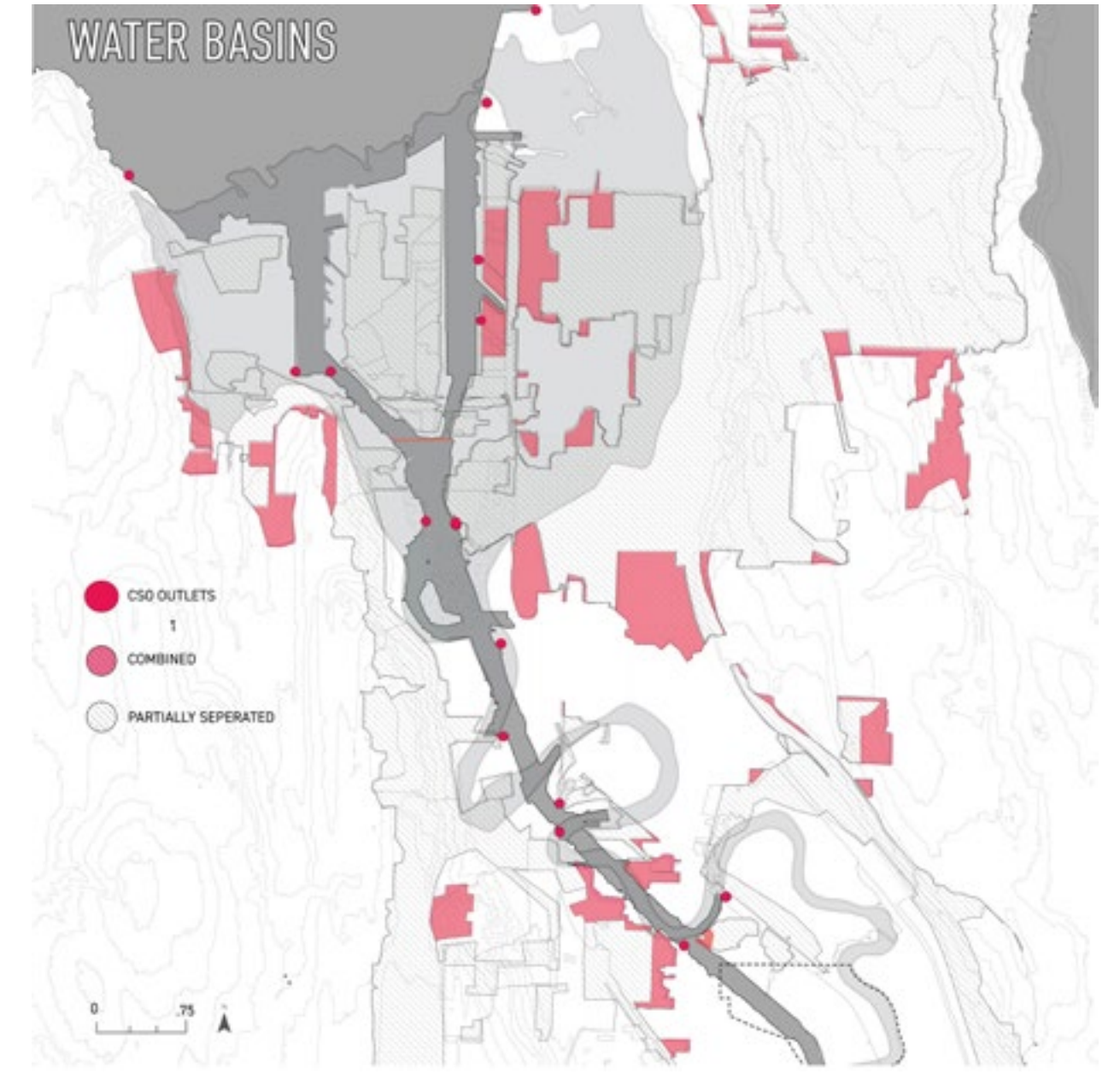


FIG. 10: MAP 2

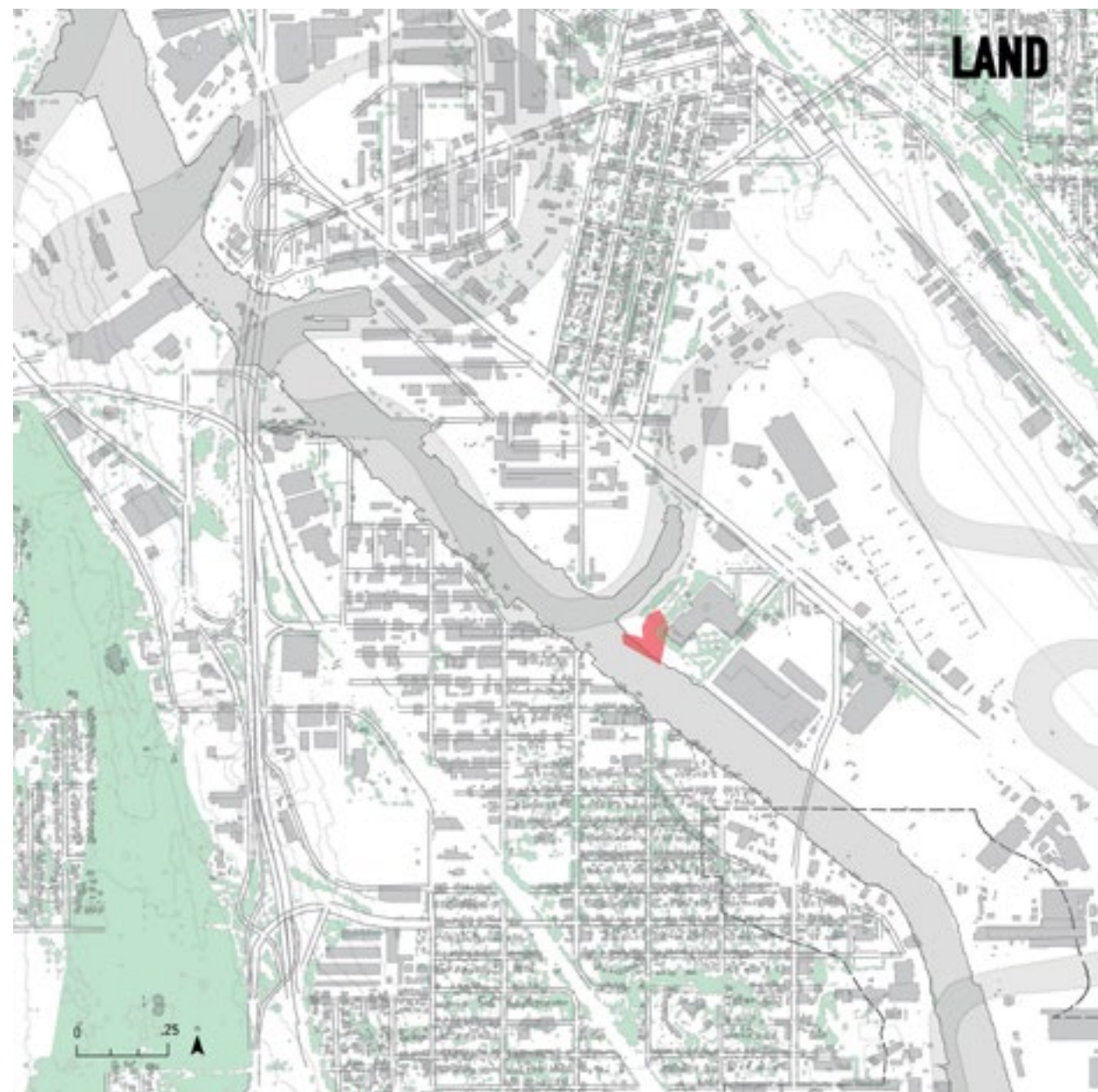


FIG. 11: MAP 3



- INTRO
- LAND + BODY
- SITE
- E-TEXTILES**
- REFLECTION

FIG. 12: THE "BELT" IN PROCESS

This chapter describes e-textiles and their creation and use on my site. The e-textiles design emerged from the open analysis of site. The intent was an artistic rendering to witness body in site through motion. I wanted to form an open-ended experiential dialogue between the site and myself. I was influenced by the motivation to nurture the relationship between landscape architecture and digital arts. This thesis was an opportunity to explore creative pursuits and push outside of visual media inviting users to experience the site.

#### Goals:

The goal of this e-textile design overall is to encourage and emphasize becoming as a process. I embraced an open-ended future to the design, where the possibilities to witness becoming could be added to the e-textile with ease. So a key goal of this project overall was to experiment, as a designer, with the creation and use of e-textiles to explore and understand a site, particularly my chosen site along the Duwamish River in Seattle. For the creation of the e-textile

itself, my main design goal was to create a wearable electronic device that had a combination of both a cyborg and an organic feel to mimic capitalist ruins. I did this by using linen textile, a natural fabric, with copper/silver embroidery. This was a speculative design (explain what this means to you). I also wanted to experiment with geometric shapes in juxtaposition to the embroidered silver-lined thread that delicately meandered on the fabric to evoke the sense of river from a bird's perspective. The intention of the final design was to experience process in the hopes of forming an enriched relationship between body and land in the future.

#### Design Principles:

To meet the above-mentioned design goals, I wanted to leverage my evolving knowledge of the site and e-textiles. Sharing knowledge of e-textiles can provide innovation and collaboration, it can also elevate exposure to site. It was important to experience site as a process and analysis it through the lens of e-textile design, thereby making the experience of

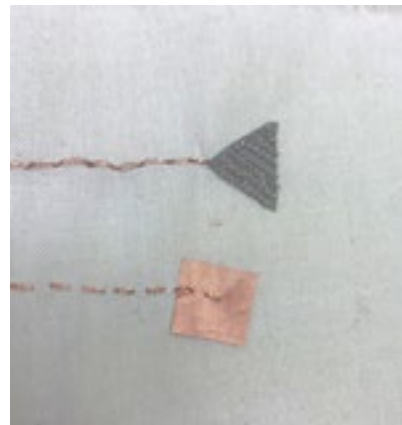


FIG. 13: EMBROIDERING PROCESS 1



FIG. 14: EMBROIDERING PROCESS 2

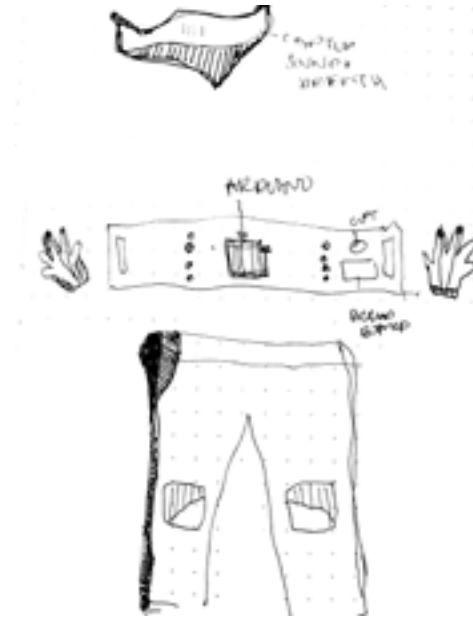


FIG. 15: SKETCHING



FIG. 16: BACK STITCHING

site palpable. The outcome of the e-textile was to:

- leverage users knowledge of site and e-textiles
- illuminate the connection between land and body

These principles kept me grounded to purpose within my work in e-textiles. I then moved forward guided by these principles and goals.

#### design

E-textiles are a "textile substrate that incorporates capabilities of sensing, communication, power transmission, and interconnection technology to connect sensors and microprocessors to allow information processing devices to be networked together in fabric" (Seymour, 2008, p 21). Sensors can detect multitudes of data—textile sensors, in particular, are capable of capturing our ever-changing physical and emotional state through the capture of electrical currents in our epidermis. Sensors were one reason e-textiles felt so enticing as a medium; they establish and document the connection between a person and the environment. The capacitive sensors'

variables are captured into a computation that determines the outputs. The sensors' outputs can "stimulate the senses of the wearer or their audience" (Seymore, 2008, p 18). Outputs have the capability of shaping a tactile experience. It was the many possibilities of witnessing embodiment that I felt was especially pertinent to my landscape architecture studies. Therefore, the outputs of my e-textile were sounds that altered in frequency and speed as I came into proximity to different elements in the landscape. I created such an e-textile to challenge my own interpretations of what they are and could be as a creative, tactile tool for learning about the embodied experience of a landscape.

To reflect my design approach of making a tangible product inspired by the idea of "becoming," I needed the overall design needed to be simple and versatile for a fluctuating process. There were three main components of the e-textile: Hands, Belt, and (fabric) Speaker. The "Hands" portion of the e-textile design included two gloves that had an capacitor sensors that produce sound (auditory output). The right-hand glove is the "Earth Hand"

and has a capacitor that turns outward toward the urban landscape, while the left-hand glove, The "Body Hand", turns inward, using one's hand as a conductive point that measuring alters the local electric field of the sensor.

Both gloves were an extension of the second component, the "Belt." The sensors on the belt? worked as a capacitor, which measures the absence or presence of objects through the sensor's electrical field. The "Belt" has a microprocessor (Arduino micro) that has conductive silver-lined threading sewn on to it to provide useful points of information exchange. These interfaces (threads) are embroidered into the textile. Extending the communication capacity of the garment, I added conductive velcro at the end of these interfaces, which made it easier to add and subtract more connections to the body. These "connectors," or strips of fabrics with conductive thread and velcro at each end, extend the information to the "Hands" and "(fabric) Speaker." The code, which was developed by Afroditi Psarra, a DXArts associate professor at the UW, e-textiles guru, and mentor through

this process, translates the data received by the sensors, which are then mapped into sounds. The sound constitutes the third component of the design, the (fabric) Speaker. The speaker amplifies the coded sound that was programmed to output the variables of capacitive. I used a fabric speaker which I made to connect to the "Belt". The fabric speaker was made as arm band. On that arm band were an iron on silver spiral, magnet, and an amplifier that all functioned as the speaker.

Overall the design of my e-textile and the sensor I chose for it was essential to the concept of "becoming", which I consider a meaningful aspect of binding land and body. Capacitive sensors detect a change in the electric field that registers either touch or proximity, in addition to humidity and fluids. This kind of detection provides sensing with an existing body (using the body as ground) and awareness of motion through the site by measuring the distance from the electrical field of earth (ground plane). Essentially, this was a strategy of capturing "between moments" – the approach

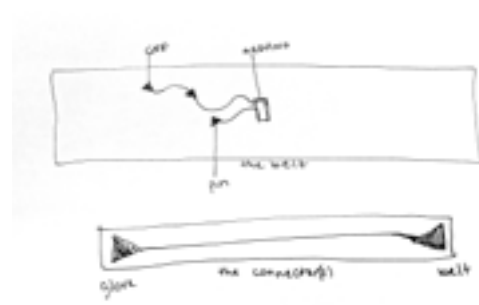


FIG. 17: SKETCH OF BELT + CONNECTOR



FIG. 18: SOLDERING COPPER FIBER



FIG. 19: THE BELT BEFORE EMBROIDERING

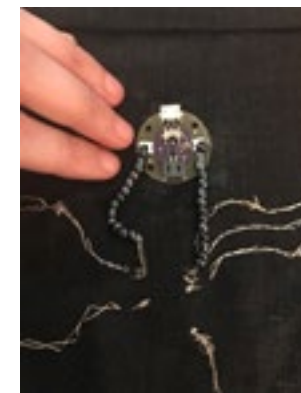


FIG. 20: THE BACK OF THE BELT



FIG. 21: TESTING CONNECTION 1



FIG. 22: TESTING CONNECTION 2

and departure, the movement in the process of its unfolding, being revealed through sensing. Through this process, I offer to explore site through embodiment and analysis..



FIG. 23: FULL E-TEXTILE PIECE



FIG. 24: (FABRIC)SPEAKER



- INTRO
- LAND + BODY
- SITE
- E-TEXTILES
- REFLECTION**

FIG. 25: COLLAGE OF SITE

Overall, the thesis intention was to explore the following questions:

1. How can movement, like walking, engage users in a deeper understanding of the nuances inherent in capitalistic ruins?
2. How can an embodied e-textiles experience challenge or complement my assumptions of capitalist ruins?
3. How can the embodied knowledge enrich the e-textile experience?

I see e-textiles as a creative endeavor to explore my interest in walking, process, and place-based experiential investigation. I began with an interest in e-textiles and wanted to connect e-textiles to landscape architecture, so setting up these questions helped me investigate those ideas further. Along the way, I was influenced by the concepts of process and becoming. I found walking to be a pivotal inspiration from which to organize my e-textile design and pursue my thesis exploration. As I conclude this thesis, I continue to find walking an essential part of my day and e-textiles as a life-long design journey that I am still on.

## A DIFFERENT KIND

This thesis described the engagement in utilizing e-textiles as a creative tool for seeing and hearing the embodied experience of the landscape. In the field of landscape architecture, e-textiles are an untapped resource. More commonly, e-textile pieces are utilized by artists, computer scientists, and DIY tech punks. Much of e-textiles concepts are focused around embodiment, and in fact, Facebook has recently been hiring “soft designers” (aka e-textile designers) to enhance their virtual reality experiences. It is a budding technology that I felt needed a general introduction into the world of landscape architecture. This thesis became a way to deepen my understanding not only of e-textiles but of place identity and site.

Any relationship we have with the world is formed through immersion in place. This is why walking felt like a solution for me during the pandemic. It was a way to access the world yet still remain “safe” from the virus. Walking warrants a sense of engagement through the

unfolding of a kinesthetic experience. Earlier in this thesis, I highlighted the connection of an understanding of place to a series of site visits. Walking while wearing e-textiles and not wearing them gave me a tangible experience that helped me to embody the theoretical concepts of place I considered in this project. This research and the site visits I made informed me that movement through the site could give a person access to the process of the emergence of serendipitous experiences. This experience of walking on site gave me a deeper understanding of the experience of walking through a capitalist ruin.

During the site analysis phase of design, the basic way of presenting a site is through mapping and diagraming. These are powerful tools that map projections of site. Mapping and research provided me with a fuller grasp of the site’s more hidden aspects, the less visible experiential aspects. Visiting the site helped me develop a meaningful relationship with place. An extension of that process was diving into the past and understanding the aspects of the site. This process of walking with e-textiles helped show

me a full picture of the site. Yet still, I would argue, the most valuable part of the process are the site visits themselves, although they do present some challenges. In general, the practice of visiting any site often and regularly can be expensive and time-consuming yet it offers vital information. Walking, and especially walking in e-textiles, allows for open-ended encounters with an additional rich layer of information from the sensors, underscoring the significance of process and becoming. In addition to building a significant relationship between site and place, the embodied experience of movement in space had informed the e-textiles design overall.

## DESIGN PROCESS

As the pandemic progressed, I continued to develop strategies to find the best design process for the e-textile I made. In Chapter 4, I discussed the design of the e-textiles. Movement and flexibility are the center of my design iterations. The design of the e-textile emerged from my practice of walking. Originally, I had

thought to measure capacitive sensing through knee pads forcing users to kneel to the ground. After establishing that I wanted to interpret a more fluctuating process, I knew the design had to reflect a more tactile experience through touch and movement. Through different iterations in response and consideration of site, I landed on the design depicted and described in this thesis. The goal of this design is to encourage and emphasize becoming as a process. I embraced an open-ended future to the design, where the possibilities to witness becoming could be added to the e-textile with ease. Yet, for this thesis design, I embraced walking as the main objective to experience an unfolding process of the site. In my opinion, walking is the best mode of dialogue and engagement to form a deeper connection to site.

E-textiles is an exciting and fun way of artistically showcasing embodiment. Yet, there are various cons to building e-textiles. It can be costly, depending on the fabric and tools required. I had access to a studio that had the necessary tools to develop the e-textiles, but it

still required some personal funding for some materials. When the University of Washington closed, that studio became unavailable, and it required me to purchase some equipment to finish the final design. E-textiles also do not have a long life and need to be maintained and updated over time. As Seymore writes, "An electronic component may have an estimated life span of 3 years or more and a typical article of clothing might be disposed of after a couple of seasons"(2008, p. 23). Also, the disposal of an e-textile can be hazardous depending on the material. Most e-textiles require batteries, which are thrown out when the lifespan of an e-textile expires. This begs the larger question: What happens to all the hazardous components after removal? Hazardous waste is an issue that hasn't has not been solved and impacts low-income areas the hardest. An example of that is the site itself, Boeing Plant 2, a capitalist ruin. E-textiles can inadvertently be a contribution to the creation of capitalist ruins if manufactured/ dumped at a large scale. E-textiles is best utilized as a personal expression and explorative

construction of textiles, where the environmental impact is lower and the expected upkeep and care for the piece are higher.

### SELF-REFLECTION

The design of the e-textile and this written portion of this thesis are based on physical embodiment to investigate intimately inhabited places. This thesis was linked to the pedagogical framework of learning through hands-on and place-based experience that encourages learning through site-informed design and first-hand connection to site. Here, I reflect on my process, as this thesis was an investigation into how to embrace process.

I learned a lot through this thesis. The following three remain the most significant lessons:

1. Designing and creating a textile that captures the intangible aspects of embodiment, encouraging new knowledge of different skills.
2. Learning more about human experience of site a site placeidentity aandnd

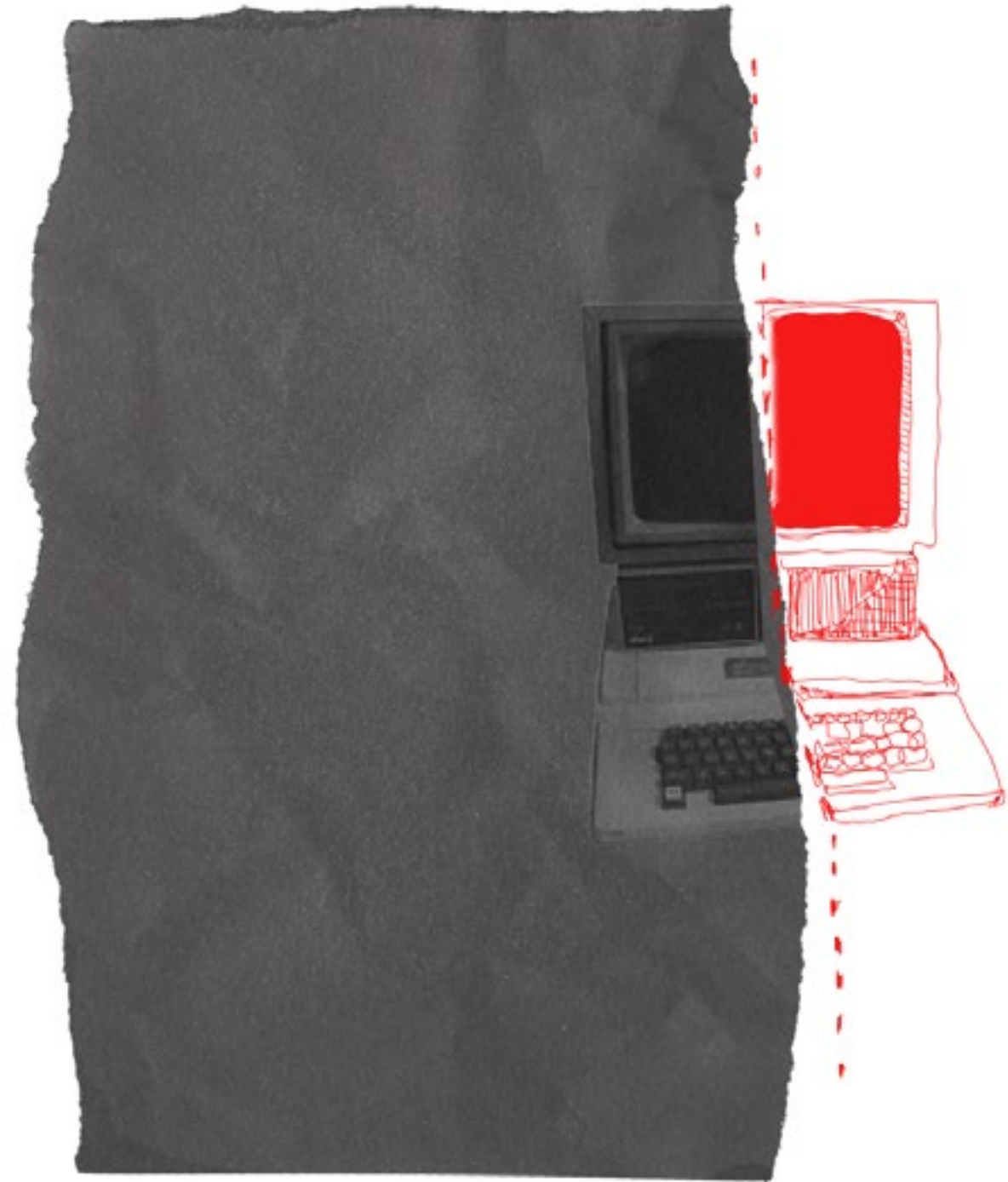
how walkingw it is an informs walking as a valuable piece of site analysis.

3. Insight on the post-industrial, capitalist ruin that is the Lower Duwamish River.

In the professional practice of design, I remain inspired to push boundaries and explore a sustained design model in more detail. I am curious to see how embodiment can be explored in the larger context of the built environments. In the academic context, I was encouraged by the department's reception of my unique thesis idea and, in the future, plan to refine this practice of weaving theory into design practice. I learned many skills and will hold that closely, but most importantly, I found a desire to learn more. The curiosity bug can sometimes be a burden. It was a long journey of trials and tribulations. The framework of place-based experimental design allowed me to design for, experience, and better understand marginalized industrial areas, such as the Lower Duwamish River. I will carry this curiosity forward with me, and continue to embrace the unfolding experiences in appropriated sites.

The pandemic also ended up becoming

a character in this thesis due to the unique boundaries that it presented. I found walking essential to best access of my local environment. Where and how I wrote this was because of Covid-19. This thesis is a product of this moment in time. It is a narrative of an experience that unfolded through the design process and throughout these pages I assume most theses from this past year and the upcoming year will similarly reflect these strange times. It was an unsafe time; there is little precedent on what to do next. I hope to continue my curiosity in this daunting time. . Each understanding, much like the e-textile design, is being sewn into the next. I will continue to weave these pages into whatever bizarre reality comes next.



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