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Optical Hygiene and Modernity: A Site Analysis of Hyperion Water Reclamation Plant Using Lefebvre's Triad

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Abstract

Hyperion Water Reclamation Plant sits at the edge of Los Angeles County as an almost unknowable infrastructure. Unlike the city block, the grocery store, or one's own home, this integral part of the urban landscape asks not to be experienced by its users, only the employees who work there every day. This place, which I'd hesitate to call a place, amalgamates preconceptions about infrastructure, sewage, purity, danger, modern architecture, and the role of the state.

In this thesis I conduct a site analysis of Hyperion Water Reclamation Plant in three parts, or moments based loosely on Henri Lefebvre's conceptual triad: perceived space, conceived space, and representational space. Though Lefebvre's analysis of space has inspired this thesis, as opposed to a more social scientific interpretation of the triad, this thesis conducts an aesthetic analysis of the plant. In moment one, the analysis will include some work by social scientists and theorists to probe the meaning behind our modern sewage infrastructures before we see that meaning applied to the plant itself. Moment two applies these theories and meanings to an institutional history of the plant and modern digital conceptions of the plant. Moment three then combines history and theory in a ground truthing of the plant based on Jan Gehl's *Cities for People*, followed by a comparison to Brightwater Wastewater Treatment Plant in King County, Washington. Through these site analyses, I ground theories of infrastructural aesthetic and hazardous waste in the site of Hyperion.

Looking toward a future of climate action and hazardous waste, I argue that the change we need is the abolition of large-scale sewage systems and dangerous concentrations of sludge, but the first step towards this abolition is to open these public infrastructures to conservations

based on our lived experience of them. From there we can reach a public critical consciousness which might allow us to move towards reimagining the urban form.

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For all the staff at Hyperion Water Reclamation Plant who waived back at me from the opposite side of the chain link fence, thank you. Thank you to my friends and roommates who have listened to me incessantly talk about sewage this last year. And lastly, thank you to my parents and sister who also listened to me endlessly muse about sewage, and who took great joy in telling their friends that their son and little brother's undergraduate thesis is "full of poop."

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Introduction: My first trip to Hyperion took place at night

On July 11 and 12, 2021 Hyperion Water Reclamation Plant located in El Segundo, California, discharged 17 million gallons of raw sewage into the ocean off Dockweiler Beach. Key first responders were not informed until hours after the spill and swimmers were not informed until even later. Los Angeles Environment and Sanitation, the organization in charge of Hyperion, responded as if they had committed a heinous crime (Lopez, 2021). They apologized profusely and claimed they had "no excuses" for the tragedy of that event. Bacteria levels in the water surrounding the plant stayed well within state levels post-incident. Contrary to these reports, residents near the plant reported fumes, eye irritation, and skin irritation.

Everyday Hyperion is in operation, receiving millions of gallons of waste from households and businesses across Los Angeles, the county works hard to mitigate smells and ensure that final effluent product from the plant will not violate state pollution levels. Given the precarity of this arrangement, it may not surprise that this is not the plant's first spill. Prior to there existing a plant at Dockweiler Beach in El Segundo, the City Engineer's office of Los Angeles simply dumped raw sewage onto the beach in a constantly accumulating brown streak. Grease and detritus from the sewage sprawled over the coastline in a phenomenon called Brown Acres. Before that, sewage systems in Los Angeles ended at large cesspits, or holes full of feces and other human wastes that would be sold or reused by local farmers. Before that, residents would dump feces more haphazardly into *zanjas* or irrigation ditches which doubled as cesspits.

At smaller scales, intense smells used to perforate urban landscapes. Until human waste was concentrated at a large scale, necessitating sewage systems, this gas was less noticeable. When human waste accumulates, under anaerobic conditions it produces hydrogen sulfide,

producing a characteristic rotten egg smell. Consequently, sewage systems have created their own hazard. They've concentrated waste as opposed to dispersing it. Hyperion Water Reclamation Plant contains a history of sewage concentration and evolving conceptions of responsibility towards hazardous waste. Even with this complex and sensational history, Hyperion simply sits by the ocean, an unmentionable or unquestionable modern infrastructure.

I drove to Hyperion Water Reclamation Plant located in El Segundo, California around 9:45 pm, making my way down from Venice on Vista Del Mar. Desert met coastal ecologies and the coast engulfed heavy industry as the road moved away from inland. I rounded the curve of Vista Del Mar following a bridge over the wetlands. I heard and then spotted a jet taking off close overhead. It emerged from the low coastal hills and the engine's hum melted into the crashing surf, for Los Angeles International Airport sprawls inland beyond the dunes. The ocean showed a deep black from my passenger's side window, except for the hazy orange reflection coming from a cruise liner further out from the coast. As I drove further south towards the plant the hills diminished and the brilliant lights of industry blasted through the mist, a mix of old warmer incandescent lightbulbs and harsh fluorescent LEDs each sort of brilliance speaking to the productivity of the entity they enshrine: old industrialism is built upon by a new well-informed industrialism. At first the plant looked like a pavilion at Epcot, a retro futurism I associate with Floridian capitalism. Countless laboratories with foggy glass and tubular steel facades. Passing the main entrance to the facility and the staff parking lot, I saw opaque specters mingling with the piping infrastructure. Four to six domes illuminated from below by incandescents. These are the centerpieces to this monument of progress and dominance over human shit (figure 1).

fig. 1. Digesters at Hyperion Water Reclamation Plant pictured through chain link fence at nighttime from: Stone, Billy. 4th September 2021, Author's personal collection

Farther along, I spotted more piping I couldn't name or identify, larger industrial hangers in the back. Peering into the plant through a chain link fence felt like a visit to a Japanese garden, each hole in the fence a planned vista for me to behold the monument. Beyond the plant came the Hyperion Pump Station. My car passed under what appeared to be a pipe with the same retro curving siding, tubular steel facades of the endless horizontal buildings I had just passed, dark grey under a lighter grey sky, revealing a city of industrial light pollution. The constant concrete buildings gave way for a moment in an expanse of emptiness leading to the pump station. From far away a pump station's glistening lights beaming from large towers appeared like a city skyline. The lights on the tower danced, flickering on an off, tricking my eye into thinking there was movement: much like people in windows, working through the night. Like people in

corporate offices, there were objects at work. In these pipes there were chaotic agencies which I perceived, which acted upon me.

Like any object performing work, energy was lost through commotion. Entropy dictated a separate sonic landscape which landed upon my ears, uniquely telling me that work was being done. Compared to the sounds of waves crashing to the other side of the plant, the liquids flowing through the pipes of the plant distinguished themselves. More of a light hissing than a fat crash. The gushing and swooshing of industrial activity christened the pipes and pumps with a commotion that seemed subhuman, almost natural like a stream, but too industrially consistent, controlled.

Hyperion, despite these perceptions, sits at the edge of Los Angeles County as an almost unknowable infrastructure. Unlike the city block, the grocery store, or one's own home, this integral part of the urban landscape asks not to be experienced by its users, only the employees who work there every day. This place, which I'd hesitate to call a place, amalgamates and merges my preconceptions about infrastructure, sewage, purity, danger, modern architecture, and the role of the city and the state. From the chain link fence, I could see that Hyperion is a site that challenges my conceptions of sanitary habits to which I've grown accustomed. At Hyperion I felt a distinct and complex sense of place. This thesis aims to examine just that.

In this thesis I will conduct a site analysis of Hyperion Water Reclamation Plant in three parts, or moments based loosely on Lefebvre's conceptual triad: perceived space, conceived space, and representational space. Though Lefebvre's analysis of space has inspired this thesis, as opposed to a more social scientific interpretation of the triad, this thesis will conduct an aesthetic analysis of the plant. In moment one, the analysis will include some work by social scientists and theorists to probe the meaning behind our modern sewage infrastructures before

we see that meaning applied to the plant itself. Moment two will apply these theories and meanings to an institutional history of the plant and modern digital conceptions of the plant. Moment three will then combine history and theory in a ground truthing of the plant.

Methodology: Lefebvre's Triad

In "'Ground Truthing' Representations of Social Space: Using Lefebvre's Conceptual Triad," Jana Carp uses an open-ended method which I will appropriate to examine the aesthetics of Hyperion. In remote sensing, geographers use field observations to interpret remotely sensed data. The process of making these observations is called ground truthing. Carp proposes a method of ground truthing outlined in Marxist philosopher Henri Lefebvre's seminal work *The Production of Space*. Lefebvre theorizes a "truth of space" to describe the diverse and divergent socio-spatial processes which occur in any given space; he also critiques a state-supported homogeneous use of space. Carp proposes that we can transcend the bounds of state-supported homogeneity as planners by using Lefebvre's conceptual triad to understand divergent uses of space, thereby creating space that accommodates diverse uses (Carp, 132).

The first aspect of this triad is perceived space. We examine this aspect of the triad by looking at patterns of movement in and through physical places, what Lefebvre called spatial practice. How one perceives a physical space depends on how one moves throughout it. Space has a universal physicality to it, but also depends on the individual perception of it. The second aspect of the triad is representations of space — or conceived space — which refers to any mental activity exerted regarding "physical space." Like perceived space, conceived space means many things. It refers to maps or to the verbal activity of planners, scientists, or property

managers, what people say about space. It also refers to unitary organizing principles such as linear perspective, or even the building code used to create dominant representations of space such as districting, the ideology behind how a city divides space.

Perceptions and conceptions of space can diverge. More people think about the built environment than design and build it, and these users have multiple contesting agendas of what should happen in space. Problems emerge when the abstract nature of conceived space does not integrate the users' dialectical perceptions of space (Carp, 134). Urban planning, as Lefebvre saw it, drew conclusions based on maps and representations of space but failed to identify perceptions of space which could diverge from official conception. Today's urban planning aims to incorporate diverse narratives and feelings about space. According to planners like Carp, studying only these representations conflicts with the agenda of planners that aim to make space inhabitable for all users, for "we know nothing perceptual about a place we've never been" (Carp, 133).

However, to fully understand space we have to incorporate a sort of shared ephemerality of space: those moments when our conceptions and perceptions of space seem to unite into a narrative. The final aspect of Lefebvre's triad is representational space or lived space. Lived space transcends perceived space and conceived space. It is "infused with meaning that cannot be adequately expressed without verbal, visual, and/or kinesthetic symbolism" (Carp, 135). Carp gives the example of the idea of suburbia. Suburbia communicates to some a sense of modern wastefulness and to others a sense of belonging. According to Lefebvre it may be the work of great art or performance to temporarily unite our sense of representational space. At a concert we may identify so strongly with the performer that we live vicariously through them, and for a

moment we all live the space as if we were them (Carp, 136). I will expand upon representational space and its origins in moment three of this thesis.

Applying Lefebvre's triad for site analyses, Carp asks her students to:

A) Analyze patterns of movement
B) Analyze the physical design, arrangement, and decoration of a space
C) Examine one's own sense of place in relation to a site and others' speculated or known sense of place in the site.

After examining a space in relation to each aspect of the triad, students emerge with a more complex understanding of the space, and how users' perceptions of it can diverge. Can a deep understanding of the human dimension of space lead to better "material, ecological, and social conditions for those who belong there" (Carp, 136)? She has seen planning use the triad to sustain diverse but compatible uses of space, so she would likely contend that the answer to the question is a resounding yes. Carp follows an example of the triad used during the creation of a committee which oversaw sustainable development along an urban stream. Some stakeholders cared for economic development along the river corridor, others concerned themselves primarily with the ecological health of the river. Within the committee Carp included stakeholders with a "diversity of conceptual expertise," all with common concern over the river as a place. By holding committee meetings at restaurants along the river and putting these different conceptions and perceptions of place head-to-head, Carp was able to align divergent senses of place for a common goal.

While Lefebvre comes from a lineage of Marxist philosophers who have reached conclusions for how Marxism manifests in local space, Carp diverges from Lefebvre's effort to explain space in terms of an empowered state and resigned "users," and instead concludes that

power is more complexly distributed at a local level (Carp, 141). The triad can be used to examine which perspectives are included and excluded from spatial decision making and work to remedy and substantiate lived spaces by affirming sociospatial differences.

I will however diverge from either use of the triad. While this thesis borrows concepts from sociology, it will use them for an aesthetic analysis of the plant. I aim to conduct a ground truthing similar to Carp's students, but to examine the wealth of meaning produced by the Hyperion Water Reclamation Plant and provide a foundation by which a space can be designed that aesthetically acknowledges diverse conceptions and perceptions of space. In this way I borrow a sociological framework to say something more about the architectural aesthetic of the plant. Hyperion becomes an allegory for histories and cultural attitudes towards sewage. In line with Lefebvre's triad, I've split the thesis into three sections or moments: perceived space, conceived space, and lived space. The first moment theorizes what we might mean by perceiving space by examining histories of sensation in architecture and sewage infrastructure. Further, this section provides a framework for conceptualizing a "non-place." The second moment examines the history of the Hyperion Water Reclamation Plant as developed in Anna Sklar's *Brown Acres*. In which she examines Hyperion in relation to the histories and theories of sensation in architecture and sewage infrastructure discussed in the first section. I then compare this history to the technology centric information provided by the Hyperion website. Finally, the third moment conducts a brief site analysis of Hyperion using a framework created by Jan Gehl along with a comparison to the Brightwater Treatment Center in King County, Washington. Each section examines what might contribute to one's sense of place at and around the Hyperion Water Reclamation Plant.

Moment 1: Perceived Space

Non-places: The Hygiene of the Optical

In *The Eyes of the Skin: Architecture and the* Senses, Juhani Pallasmaa discusses the disappearance of sensory and sensual qualities from architecture and the focus instead on vision, "the most noble of the senses" according to Plato (Pallasmaa, 20). One example of this focus has been the profession's shift away from physical architectural models to virtual, computer-based digitization of them. Our experience of the imagined architecture becomes projected on a screen, a 2D set of visual intricacies for our eyes to dance over rather than a physical experience which engages our whole self. Pallasmaa refers to the body as the "locus of perception, thought and consciousness" (Pallasmaa, 11). To isolate sight in architecture, or to prioritize the use of sight over the other senses detaches our bodies from the architectural experience and thus detaches this locus of consciousness from its larger structure – the universe.

Architecture which privileges certain sensory experiences over others necessarily precludes experience for individuals with different abilities. Central, but not discussed by Pallasmaa, is ableism. According to the social model of disability (Brown, 1995), disability does not exist innately within a person; cultural context/environment implicates disability. Architectural theories argue that the built environment creates stigma by implying what should be considered "normal." Pallasmaa describes architecture which detaches us from the "flesh of the world" (Pallasmaa, 22), as a "hedonistic but meaningless visual journey," (Pallasmaa, 25). I assert that there are also greater injustices produced by architecture which privileges one sense over others, or outright ignores sensory experiences such as smell, sound, and movement. Carp

would contend that these differences in perception are at the heart of inclusive planning. This thesis will not center itself around disability theory, but I believe the topic lurks beneath the surface of any conversation about perception, because different people perceive things in disparate ways, and often certain perceptions are privileged over others.

Built space and architecture that subverts this diminished or "meaningless" visual journey can be more inclusive of people of many different sensory experiences by purposefully engaging each of our senses. Pallasmaa draws attention to a breadth of techniques to engage more than just sight. To create an architecture which first appears more tactile, Pallasmaa suggests incorporating shadow. Deep shadows "dim the sharpness of vision, make depth and distance ambiguous, and invite unconscious peripheral vision and tactile fantasy" (Pallasmaa, 50). Shadowing architecture diminishes the importance of the visual experience and enhances others sorts of tactility. In addition, Pallasmaa suggests here that shadow can excite our experience of the periphery of vision, the edges of our eyes, where sight and skin begin to intermingle.

Often overlooked, shadow not only plays with the sensory experience of architecture but determines the livability of an area. In the public architecture of Los Angeles County, shadow, and shade are used deliberately. In vast asphalt surfaces, as that which surrounds the Hyperion plant—and much of Los Angeles County--the importance of shade cannot be overstated. For example, the original Pershing Square in downtown Los Angeles was populated with exotic trees. In 1951 the park was reimagined as a grass field with a parking lot underneath. It's soil was then too shallow to root large trees. Notably the shade and benches had disappeared from the area as an effort to rid the park of "deviates and criminals," i.e. drug users, gay cruisers and other "shady" individuals (Bloch, 2019). Thus, the city of Los Angeles made Pershing Square into a shade-less and sterile wasteland. Not surprisingly, the park became a place only where people

travel through, not where people sit, and the park lost its sense of visual tactility. Playful design and refuge were substituted for a cruel functionalism.

Sonically and aromatically, design should also invite playfulness. Acoustically, the designed space should not only be silent but include a sonic tactility. The wooden planks fashioned together on old docks reverberate with each step taken over it. Voices echo and muffle in old churches. In such architecture "matter, space and time fuse into one singular elemental experience, the sense of being" (Pallasmaa, 55). Scents create their own microcosms as well. Spaces carry their own scent, and that scent attaches itself to embodied memory. An old cabin smells like pine and dust. Suburbia can smell like freshly cut grass. Adobe bricks can smell earthy or emanate ocotillo and mesquite from the desert wash.

Ignoring these rich sensory experiences, modern architecture focuses entirely on sight. Pallasmaa argues that "the inhumanity of contemporary architecture and cities can be understood as the consequence of the neglect of the body and the senses…" (Pallasmaa, 21). Contemporary architecture which neglects the senses has been influenced extensively by Swiss French architect of the early 1900s, Charles-Édouard Jeanneret, more famously known as Le Corbusier. Le Corbusier famously said, "I exist in life only if I can see," and this focus on sight is reflected in his design: large horizontal spaces with little room to inhabit, relying heavily on a sense of line and perspective to create a sense of awe in the beholder. Perhaps due to this ocular centrism, contemporary architecture has lost its sense of tactility, details crafted to be held by the human body, the hand, and instead become "repulsively flat, sharp-edged, immaterial and unreal" (Pallasmaa, 34). This "flatness" can directly contrast to other styles of architecture, Baroque for example (Pallasmaa, 38). Baroque's visual experience is strongly tactile. It invites touch. It considers the texture, weight, density, and temperature of matter.

Modern building techniques may be partially to blame. Industrialization has allowed the rapid construction of new buildings, or perhaps industrialization has lacked the insight that a slower paced and more organic planning of urban construction once had. Pace helps us understand our focus on visual experience in architecture; a focus on imagery reflects a change in our relationship to time. David Harvey describes this process as the "loss of temporality and (the) search for instantaneous impact."

A loss of the temporality of space correlates with an excess of space. In *Non-places: Introduction to an Anthropology of Supermodernity*, Marc Augé describes an individual's experience in an airport. "These days, surely, it was in these crowded places where thousands of individual itineraries converged for a moment, unaware of one another, that there survived something of the uncertain charm of the waste lands, the yards and building sites, the station platforms and waiting rooms where travellers break step, of all the chance meeting places where fugitive feelings occur of the possibility of continuing adventure, the feeling that all there is to do is to 'see what happens'" (Augé, 3). Though Augé does not describe the airport waiting rooms as empty, there's a universal vagueness to the description of the airport. The travel infrastructure carries with it a sense of boredom in waiting. The austere wasteland of an airport prefaces his discussion of supermodernity, a phenomenon of three excesses: excess of meaning, excess of space, and excess of ego, each of which we might find present in the airport.

This excess of space we perceive today correlates with a shrinking of the planet, the acceleration in transportation results from an ease of access to so many places which not long ago were largely inaccessible. Thousands of individual itineraries momentarily converge in the same space, conducting themselves without a shared purpose. This architecture designed for travel in turn disregards the workers or communities which live in or around this transitory

space. As a result, we see the proliferation of so-called “non-places.” Non-places obscure the definition of an anthropological “place”, or the idea of a culture localized in time and space. As Augé’s writes about an airport: “the installations needed for the accelerated circulation of passengers and goods (high-speed roads and railways, interchanges, airports) are just as much non-places as the means of transport themselves, or the greater commercial centres, or the extended transit camps” (Augé, 34). Each node in a transportation system fits Augé’s definition of a “non-place.”

An excess of space complicates our intelligence of space and begins to commodify or fetishize brief image-like glances of space as opposed to deep perceptive dives into space. We dim our grander perception of space and replace it with a full experience with disconnected images. Pallasmaa comments on a similar phenomenon: “the experiences of space and time have become fused into each other by speed… and as a consequence we are witnessing a distinct reversal of the two dimensions - a temporalization of space and spatialization of time… visual images have become commodities” (Pallasmaa, 24). Auge’s supermodernity and Pallasmaa’s description of modern architecture subject the participant to an excess of space. To salvage the resulting incomplete architecture or to coexist with our new faster transportation networks, architectures orient themselves towards brief glances thereby becoming entirely visual commodities.

Tangential to an excess of space Auge and Pallasmaa both center their analysis of modernity around ego. Augé defines supermodernity as an excess of ego, or an over production of individual meaning necessitated by perhaps overly heightened idea of a shared history or narrative: “Never before have individual histories been so explicitly affected by collective history, but never before, either, have the reference points for collective identification been so

unstable. The individual production of meaning is thus more necessary than ever" (Augé, 37). Our constant positioning in a collective history requires a hyper awareness of self, this excessive individual production of meaning being an excess of ego. To both authors, today's hyper-awareness correlates with the architecture of modernity. Auge's ubiquitous and individualist airport literally refers to the functionalist Orly Aéroport in Paris. Stated by Pallasmaa in his architectural analysis: "The gradually growing hegemony of the eye seems to be parallel with the development of Western ego-consciousness and the gradually increasing separation of the self and the world; vision separates us from the world whereas the other senses unite us with it" (Pallasmaa, 28). The obsessive individual production of meaning lends itself to architecture of space which also separates the self from the world. Though we can critique any concept of a distinctly "Western" ego-centrism in either analysis, and a philosophical critique of modern ego extends beyond the bounds of this thesis, perhaps through ego, excesses of space and the dominance of sight connect "non-places" with our infrastructural architectures of horizontal concrete.

Does our wastewater infrastructure create non-places? To determine an individual's sense of place at or around the Hyperion Water Reclamation Plant, we should consider how Hyperion's chain link fence and concrete expanse might transform the space into a non-place. We must consider which senses have been prioritized or sterilized for the construction of the space we call Hyperion today. We also must consider what Hyperion's classification as infrastructure does to our understanding of and sense of place at Hyperion.

Poetics and Infrastructure

Horizontal concrete facades and pipes characterize the architecture of modern industrial or infrastructural works: hydroelectric dams, energy resource centers, recycling centers, ports, and other facilities. Perhaps to Pallasmaa, these facilities prioritize a functional architecture, and the aesthetic of these facilities does not consider sensory experience beyond sight in its design. Or perhaps Pallasmaa sees a sort of tactility in the shadows and sounds created by pipes. Even a swath of concrete can produce a glorious echo in the right configuration.

Pallasmaa defines our body as "both an object among objects and that which sees and touches them," (Pallasmaa, 22). In the idea of "representational space" Lefebvre came to a similar conclusion. The material world and the world of ideas, the body and its perceptions, are self-imbricated or layered upon each other. Our bodies act as a sort of loci, or even infrastructure for perception: social and behavior processes that interact with physical substratum. Our industrial infrastructures can begin to simply appear as extensions of our bodies and perhaps in our brains they are mapped as such. As proposed by Freud, our machines as auxiliary organs make us into a sort of "prosthetic god" (Foster, 1997). When our machines become auxiliary organs, that is when we can begin to define them as infrastructure.

To understand the sensory impact of Hyperion, we need to better understand Hyperion as infrastructure. In *This Is Not A Boundary Object*, Susan Leigh Star defines infrastructure as something that is embedded in other structures, social arrangements, or technologies, something that is learned as part of a cultural membership, something that is built on an installed base, and something that becomes visible upon breakdown (Star, 611). Star's definition not only applies to the physical infrastructure we typically picture when we think of infrastructure, but also to the social objects which operate as such. The social objects and social processes construct

infrastructure in our imaginations. They remind us of what we should expect when we think of infrastructure.

In infrastructure studies, it is often said that when infrastructure is disrupted for some reason, that's when we 'see' it. However, it is not necessarily true that infrastructure is an invisible feature of society, for "all visibility is situated" (Larkin, 335), and when we look further at the aisthesis of infrastructure or the bodily reaction to lived reality, we see that our infrastructures produce the ambience which colors everyday experience: "Infrastructures operate at the level of surface… rather than the mind inside" (Larkin, 337). This ambience we can refer to as "poetic." The poetic is one of six meanings of a speech act where form is loosened from technical function (Larkin, 334). Poetics communicate in the same way as the Aristotelian concept of aisthesis: taste, touch, hearing, seeing, and smell. Each infrastructural project communicates through this poetic ambient experience. For this reason, even when infrastructure loses its functionality, it still produces some meaning in the observer, prodding at the invisibility with which they operate both physically and mentally. Pipes that are not connected to water systems still evoke some meaning of water systems. To again summon Lefebvre, infrastructure operates at a perceptive level but perhaps not actively at a conceptive level for many. We touch and experience infrastructure but perhaps we do not discuss these interactions each time they occur. In this way, interaction with infrastructure is a deeply perceptive experience. It's something that is felt.

Miasma and danger

Every day we interact with sewage infrastructure in the privacy of our homes. Waste treatment in any society, even those who use perhaps more progressive means than our porcelain

bowls and massive treatment plants, is a sort of infrastructure. It is learned and operated so consistently that it becomes a subconscious interaction. To understand Hyperion and its effects on our psyche, we must investigate why our sewage infrastructure in Los Angeles, California operates the way it does. To do this I believe we have to explore the theory of perception, danger, and human waste.

Pallasmaa refers to our modern architecture as a hedonistic visual journey, a detachment from the flesh of the world, while referring to the opposite of architecture which stimulates a polyphony of the senses as the "hygiene of the optical" (Pallasmaa, 32). At first Pallasmaa's use of hygiene confounded me. What does the silencing of varied perceptual experience in architecture have to do with hygiene? However, the history of hygiene is history of sensory experience and its silencing.

The history of sewage follows the history of intestinal disease. Because of close quarters, unsanitary living conditions, and fecal contamination of rivers and other water sources in cities, urbanization coincided with an increase in intestinal disease. In the early 19th century, as the British colonized northeastern coastal India, *Vibrio cholerae* began to spread beyond its endemic home. Following its migration, the intestinal pathogen fueled seven epidemics worldwide, three of which took place during the 1800s. These three epidemics shaped the urban and medical history of each city which bore them. To prevent the spread of cholera, ever since cities have ensured that citizens drink water that has not come in contact with contagious human waste. This is perhaps the definition of "sanitary" water which would have benefited nineteenth century municipalities, but it took decades to eventually pinpoint the cause of these diseases.

In the early 1800s, Sir Edmund Chadwick and other physicians in England began to question the idea that poverty was the main cause of poor health. Even before the 1831-1832

cholera epidemic in England, Chadwick promoted the idea that the environment could be the cause of individual illness rather than an individual disposition towards poverty or poor decision making. Chadwick's focus at the time was miasma, or malodorous air. Chadwick wanted to alter the environment, conquer the miasma, by pinpointing and removing such "filth" (Melosi, 31). Though at the fringe of medicine at the time, after the 1831 epidemic, some of Chadwick's ideas began to take hold (Melosi, 31). Though environmental etiologies of miasma go back centuries before Chadwick's time, Chadwick distinguishes himself from the dominant medical thought of the time by focusing on only miasma, rather than individual predisposition or individual morality. The sanitary ideal also rejected a contagionist view of disease, meaning it did not accept that disease could be spread from person to person. Disease could only spread through environmental filth.

To channel filth away from individual households, Chadwick proposed a strong central hydraulic system and faced backlash from anti-centralizers who focused on private responsibility for sewage disposal (Melosi, 32). Nevertheless, Chadwick persisted and concrete examples of the success of filth theory-based intervention convinced many to adopt technologies and infrastructures Chadwick suggested. John Snow's famous diagnosis of the Broad Street Pump as the culprit of an outbreak in Soho during the early 1850s cholera epidemic signaled to many the accuracy of filth theory (Tulchinsky, 2018). At the outset of the same cholera epidemic in 1849 London required that all water supply be filtered, accepting that cholera spread through contaminated water.

In the 1830s, wealthier houses started to develop water closets, the English predecessor to modern toilets which flush and connect to main sewer lines which would dump into smaller cesspools (Webb, 66). More modest households dumped directly into smaller cesspools. In 1847

Parliament gave local authorities power to discharge sewage directly into the Thames or the sea (Melosi, 35), so that effluent would be diluted by large bodies of water. Early sewage systems in London faced many setbacks. Although the Thames flows to the ocean, part of the river is tidal. Because the river also manages the flow of water outwards, the tide in the river takes longer to subside than it does to flow in. The blocked flow of sewer outfalls during high tide meant that early sewers in London were tidelocked and often clogged. By 1858, the Thames was so clogged with sewage and industrial waste it barely flowed. That summer, in an event called The Great Stink of London, as heat encouraged the rapid growth of bacteria in the river, the river "fermented and boiled" (Mann, 2016). The Great Stink of London lasted two months and affected every citizen living near the Thames (Webb, 68). The event became a marker not only of the dangers in the smell of untreated and concentrated human waste but was heavily associated with the devastating cholera epidemics. Miasma theory dictated that the smells themselves were causing the epidemics, and the city was experiencing the smelliest event it had ever beheld. The whole city choked on miasma, which gave impetus for the citizens of London to consider a larger sewage system which would dump sewage further down the Thames, then affecting only the poorer residents of the city. These neighborhoods still used cesspools instead of a large-scale sewage system and yet were affected disproportionately by the modern sewage system.

The Great Stink occurred only after the city began concentrating sewage. Risk had been concentrated and once mismanaged, became more dangerous. Citizens could live with the stench of the occasional cesspool, filtered by the soil. But sulfuric acid released in the hot weather by the larger concentrations of sewage in the Thames created a health risk that citizens could no longer live with. Centralization of sewage systems created its own positive feedback loop for

danger, as did fear of raw sewage. “Though ‘flush and forget’ zones have on the whole banished diseases transmitted by feces, they instill what I will call *faecophobia*—fear of feces—in people who live in them” (Woelfle-Erskine, 121). Though miasma, the sanitary ideal and filth theory would lead empirical studies about environments and disease like those conducted by John Snow in the cholera epidemic of 1831 to 1832 and later Germ Theory, miasma is not a strictly empirical concept, and starts to borrow from ideas of the poetic or the aesthetic. Miasma is felt. Miasma is ambience, and through miasma and a history of intestinal disease we’ve culturally labeled feces as pollution.

In *Redefining Pollution and Action: The Matter of Plastic*, Max Liboiron traces theories of pollution from “matter out of place” to “allowable limits,” beginning the analysis with Mary Douglas’s *Purity and Danger*. Douglas sees “dirt,” a sort of pollution, as an object which we project our ideals upon. “Reflection on dirt involves reflection on the relation of order to disorder, being to non-being, form to formlessness, life to death” (Douglas, 5). Douglas believes that in reordering dirt we are projecting order onto an untidy experience, we are committing a positive act rather than an escape from danger. A side effect of this positive act is fear of dirt. The categorization of feces as “dirt” or pollution encouraged the creation of a strong centralized sewer system and the fear of which to encourage use of that system.

To analyze our current approach to defining pollution in the United States we can look at Rachel Carson’s *Silent Spring*. In the introduction to *Silent Spring,* Carson romanticizes a pastoral scene of a small town in the Eastern United States pre-pollution — “THERE WAS ONCE a town in the heart of America where all life seemed to live in harmony with its surroundings” and appeals to an affectual pastoral before pollution (Carson, 1). This affectual before then characterizes change as “moral transgression” (Liboiron, 93). With this ordering

Carson attempts to demonstrate the harmful effects of DDT, and morally incentivize a positive reordering of the environment. To incentivize this reordering in the reader, Carson appeals to the senses with nostalgia. “On the mornings that had once throbbed with the dawn chorus of robins, catbirds, doves, jays, wrens, and scores of other bird voices there was now no sound; only silence lay over the fields and woods and marsh” (Carson, 1). Like the incentive to create a large, centralized sewer system in London, the incentive to rid the countryside of DDT in the United States came from an appeal to the senses, to sight and sound. From this appeal readers could extrapolate an emotional idea of these “dirts”.

Despite the necessity of appealing to an emotional perception of dirt, our concept of pollution today relies heavily on dirt we cannot feel. In *Redefining Pollution and Action: The Matter of Plastics*, Max Liboiron describes the theoretical, yet deeply practical question, plastics pose for our conception of pollution. The Paracelsian ideal: “the dose makes the poison,” does not apply to the added plasticizers or monomers. The monomer’s toxicology logic becomes fuzzier, having potentially high impacts at low doses, and low or different impacts at high doses. According to Liboiron, the problem with plastics is how they deviate from a norm of a linear causation. Plasticizers, which attach to plastic polymers, change protein production and therefore gene expression. The effects of this endocrine disruption may not be discrete: one hormone can cause multiple things. The effects could even be transgenerational. As objects, their agency is non-causal. Because of the codification of allowable limits and discrete and linear pollution agency, industry lobbyists can easily attack arguments which point out non-causal agencies (Liboiron, 99). Similarly, Rachel Carson rejects the Paracelsian ideal: “who would want to live in a world which is just not quite fatal?” (Carson, 12). According to our modern regulations of pollutants however, legislators make this almost toxic existence necessary, and perhaps this is

because we cannot worry about what we don't directly feel. The threshold theory of pollution, permitting allowable limits of certain pollutants, became normalized after World War II in the U.S. and institutionalized in the 1970s (Liboiron, 94). Along with the institutionalization of allowable limits, we saw a growing dependence on laboratorial methods for tracking pollution, as opposed to cultural, aesthetic, or even medical methods of tracing pollution (Liboiron, 93, 95). Through this dependence on laboratorial detection methods, we've instilled a distrust of our gut reactions to certain pollutants, and we have progressed from affectual miasma to a general distrust of affect.

Modern sewage treatment occupies a critical juncture in these theories of pollution. A fear of intestinal disease amplified by a gut reaction to miasma justifies our dependence on large-scale sewage treatment facilities, while we also second-guess whether our gut reactions can genuinely identify pollutants. October 2021 in Carson, California noxious odors emanating from the Dominguez Channel were declared a public nuisance. The Los Angeles Public Health Department was slow to respond to residents' complaints of odors. After the nuisance was declared, the county public health department declared that the gas should not cause serious health problems (Campa, 2021). This came in stark contrast to residents' complaints of burning nostrils and constant headaches.

According to anti-sewer activists, this modern contradiction between official responses to sewage pollution and individual perception of sewage pollution could be resolved by moving away from sewers. The most vocal anti-sewer activist I encountered in my research was Abby A. Rockefeller. In *Sewers, Sewage Treatment, Sludge: Damage without End*, Rockefeller demands a revised Clean Water Act. Rockefeller's argument describes a fatal flaw in any large-scale sewage

treatment ideal, picking apart modernity's promises and dictates: sewers are the root of our problem with wastewater treatment:

> Using water as a transportation medium for waste materials is the fundamental mistake that gave rise to so destructive and unfixable a sequence of mistaken technologies: sewers leading to vast water pollution; vast water pollution leading to sewage treatment; sewage treatment leading to the production of an unusable mix of all the pollutants that treatment could remove--sludge, the climax inherent in sewers and the water carriage of wastes (Rockefeller, 344).

Our large-scale centralized systems are a part of and therefore create the conditions we see in Carson City while creating an unusable mix of pollutants: Rockefeller's solution — "DO NOT SEWER." Individual households should not connect to sewer lines or begin to disconnect by installing their own composting toilets. On-site remediation technologies should make sewer pollution "solvable" rather than "movable." Rockefeller expresses outrage at the unknown. To what extent is this outrage instinctual? Rockefeller tries to ascribe order to this fundamentally disorderly system. In Rockefeller's analysis, the sewers' disorder causes damage and creates danger.

Thus, Rockefeller has proposed a war on sludge. In 1990, the EPA rebranded sludge, the solid byproduct of sewage treatment, as "biosolids," to hopefully repackage sludge as a useful product which could be applied agriculturally (Rockefeller, 342). Biosolids come now in various classifications, undergoing various tests to determine concentration of heavy metals, biochemical oxygen demand, etc., and ranking them in terms of toxicity. Notably, biosolids are not tested for plastics. All biosolids, however, come from sludge. Sludge becomes hazardous because of the large concentration of potentially unknown synthetic chemicals as well as pathogens which enter our sewage systems. Large-scale sewage concocts these combinations. According to Rockefeller, this sludge cannot be rebranded and sold as a potentially useful product. Instead, it must be

considered a hazardous waste. It is “unmonitorable”, “unregulatable”, and “irremediable.” In sewage treatment, “the better the treatment, the worse the sludge,” (343). Per the matter of sludge, sewage as an object is more variable yet shares some characteristics with microplastics. In many ways its agency is non-causal. It carries synthetic chemicals which have differential and immediately unknowable effects. By combining so many different types of waste, and without laboratory testing to distinguish them, we cannot know the contents of sewage.

Yet sewage carries a sensorial component. At least since the advent of the nineteenth century concept of miasma, we have distrusted the scent of sewage. Microplastics, perhaps because of their imperceptible size, behave differently. We do not sense microplastics. These objects are so integrated into our ecosystems and food systems that they work their way into our insides unnoticed. They are a part of us now. Sewage behaves differently. It comes from our digestive system, carries that familiarity, and then combines to make something less trustworthy. Biosolids confuse the sensorial experience of sewage, and themselves can feel like fresh soil. Class A biosolids have a cool earthy smell, similar to an organic compost (Covey, 2016). For biosolids which contain biosolids, this is particularly concerning, as microplastics degrade in nano plastics which plants can absorb (Mohajerani & Karabatak, 2020).

Unlike biosolids, most people distrust our initial excrement, even before it adds to a larger sewage concoction. In *Poop and Pee Revolution*, Laura Allen describes the multiple ways which we can collect and process human excreta inexpensively on a smaller scale to create a closed loop system for our nutrients. Our modern sewage systems have reified “*faecophobia*” (Woelfle-Erskine, 121). Somehow a belief in miasma theory created the grounds by which we began to fear our feces’ odor, but also led us to a modernity which encourages us to ignore our sensory experience.

Allen interviews Cesar Anorve, the head of the Centro de Innovacion en Tecnologio Alternativa, an organization in Mexico created to promote ecological sanitation—a closed loop system which closes the gap between agriculture and sewage (Langergraber & Muelleger, 2005)–and discusses how our fear of sewage fits into a people's movement around water. "'This work is not only environmental,' Cesar states. 'It is political. In Mexico the government says, 'Vote for me, I'll give you water. Vote for me, I'll put in a sewage system.' This is how they control people. If people can have control over their basic human needs, like water and sanitation, they have autonomy and can't be so manipulated by political promises or exorbitant water prices'" (Woelfle-Erskine, 125). The promise of modern sewage treatment implies a certain model of state control. Modern sewage infrastructure binds citizens to state power.

A well-established sewage infrastructure like that of Los Angeles communicates something slightly different, a sort of permanence and immovability to both the state and its infrastructures. However, an infrastructure means many things. In "The Politics and Poetics of Infrastructure," Brian Larkin argues that for anthropologists, infrastructure means multiple things, but in general they define it as a "substratum that allows (a system) to operate," (Larkin, 329). When looking closely at infrastructure as a concept, we begin to lose sight of the linear relationship between the system and the substratum, for they all begin to support each other. Their relationship becomes "recursive and dispersed" (Larkin, 330). Using Larkin's definition of infrastructure, we can look at Los Angeles's sewer system not only as a material infrastructure, a system of pipes, but as the behaviors concurrent with the usage of these pipes. Ergo, the evolution of the Los Angeles sewage system changed intimate human behaviors to align with a central state model of sewage disposal. This is where I believe we arrive at what Foucault meant

by “biopolitics:” this implicit control over basic human biological processes. Sewage infrastructure regulates our insides, post excretion.

Modernity connects biopolitics and danger to the aesthetic of sewage treatment. The aisthesis of sewage infrastructure often communicates modernity; we expect sewerage and piping when we picture a “modern” society and when we experience our “modern” societies. By repeating infrastructural projects, different societies participate in “a common visual and conceptual paradigm of what it means to be modern” (Larkin, 333). And to be modern is to submit to a large sewage system, both in usage and in fear of excrement. Modernity has concentrated danger, as I will elaborate on in moment two of this thesis, while discouraging instinctual or felt reaction to danger.

Though I agree with Rockefeller in her push away from sludge and large state-controlled sewage systems, I believe that before disconnecting from sewage systems, the antidote to sterile modernity, is feeling: a deeply felt landscape. To reorient ourselves towards our sewage again in this way is a radical act. I believe the first step in this reorientation is to consciously perceive our sewage infrastructure as a means of engaging critically with it and eventually changing public attitudes towards our excrement. This is not to suggest so concretely that his would help us overcome our fears of drinking reclaimed water – because perhaps these fears are founded, but to suggest that reorienting ourselves towards sewage might allow us to actively consider a future of sewage for which we take responsibility, or consider a future of sewage on the microgrid, as scholars and activists such as Allen, Rockefeller, and Anorve have argued for. I suggest we begin to embody our reactions to sewage, and thus to excrement. I believe that when we begin to embody those reactions, we begin to reverse the curse of modernity our sewage systems have wrought upon us. Looking towards the site which my thesis analyzes, it is in some way a radical

act to perceive. The design of Hyperion says to the user: you may visit Hyperion, but you may not smell it. You may look at Hyperion from across the road, but you may not touch its pipes.

Moment 2: Conceived Space

Some Institutional history

An institutional history of the Hyperion plant is a conception of a conception of space. Each aspect of this history can give us a view into the inner workings of purity, danger, and modernity at the plant, and each aspect of this history actively informs how we perceive Hyperion today.

Early Histories and Partial Beginnings

Centuries before Spaniards arrived along the coastal plain, the Tongva people inhabited the area. The Tongva people lived in thirty-one known villages throughout the Los Angeles basin, nearest to Hyperion was called Oongovanga (Tongvapeople, Green, Curwen, 2019). It is worth noting that the institutionalization of Los Angeles water required a settler colonial understanding of water as a resource, and Tongva people are still denied basic water rights and protections (Ramona Mendoza, 2019). Spanish Settlers led by Gaspar de Portola first arrived at Kuruvungna springs (today's Santa Monica) in 1769 and by the mid-19th century, over 25,000 Tongva baptisms had occurred, rituals that attempted to erase the mythology and culture of the Tongva people. The namesake of Santa Monica comes from those springs. "Father Juan Crespi's diary remarks that the flowing water reminded him of Saint Monica's tears for her then wayward son Augustine before his conversion, as that day was Saint Monica's name day" ("Kuruvungna Sacred Springs")

The Los Angeles River empties into the Santa Monica Bay along the course of Ballona Creek, near the site of the Oongovanga. The Friends of Ballona Creek organization provides a brief history of the area. As early as 1771, the Tongva people in Oongovanga had been forcefully removed inland to the San Gabriel Mission ("History of Ballona Wetlands").

Before 1861 the Spanish community of Los Angeles did not have any sewers, just "zanjas" or irrigation ditches that doubled as cesspools where feces could be moved to or defecated into directly. In 1869, after the wooden sewers made of small square wooden pipes failed, the Common Council of the area appointed the first sewer committee (Sklar, 20). The new system, completed in 1876, was set on a level grade and often became clogged or congested. This system emptied to a cesspool in the southwest corner of the city. In 1883 the Common Council granted the South Side Irrigation Company free rights for 18 years to all sewage emptying into the cesspool to be transported and sold as fertilizer to Nadeau Vineyards and other big farms. Sewage, now concentrated, was considered appropriate, welcome, and perhaps necessary for large-scale agriculture. The local sewage system became a part of effective municipal governance. As the city grew, city sewage infrastructure also grew.

The infrastructure of the city began to change dramatically following the Santa Fe Railway expansion into the region in 1887. Collis Huntington, the president of the Southern Pacific Railway, which had arrived in 1876, hoped to drive the Santa Fe Railroad out of business through cutthroat competition (Scott, 98). Due to the fare war, fees dropped from over $100 to under $12 in 1887, and eventually even down to $1 by 1888 for both companies. Those who normally couldn't afford to travel across the country were heavily incentivized to emigrate to the new city, resulting in a large land boom in which streets, suburban railway lines, and electric

lighting systems were implemented in over sixty new towns in the L.A. Basin, quadrupling the region's population (Sklar, 23, Nordstrom, 20).

The larger city now put enormous pressure on its ad hoc sewage disposal. Cesspits and ditches could only handle so much. Among those who proposed a citywide resolution was Fred Eaton. Eaton, born 1855 on Fort Moore Hill, became the city's first elected City Engineer (Sklar, 2013). Ten years before he was elected mayor, Eaton was immersed in the city's infamous water schemes to bring water from Owens Valley with William Mulholland. In 1890, Eaton, an engineer, proposed the first citywide sewage system, consisting of a one-million-dollar project with an outfall to the sea, naturally treating sewage through dilution (Sklar, 27). The second plan rerouted the outfall to go under Daniel Freeman's Centinela Ranch (of which's Centinela Adobe is located in today's Inglewood, California) but was still too expensive and thus the municipal bonds put up for vote were again vetoed by the mayor (Sklar, 32). Often during this period, South Side Irrigation would hold the flood gates and wait to collect sewage, accumulated stenches of hydrogen sulfide would accumulate under anaerobic conditions and flood back into the city through storm drains (Sklar, 33).

Initial Attempts at Large-Scale Sewage

In 1892, the city finally approved the plans for an outfall to the ocean under The Centinela Ranch, approving the rest of Eaton's plan two years earlier. Once the outfall was complete, city health officials ordered residents to fill and cover cesspool and existing privy vaults and connect to the sewer within a few days (Sklar, 39). To avoid punishment, L.A. residents would have to align their most personal practices with the model the city provided. As a result, the systems set up by the city would become larger and more dangerous. The

biopolitical will of the city emerged from its concentration of sewage, the danger of which prompted even more biopolitical control.

The outfall jutting under Daniel Freeman's ranch was not implemented seamlessly. Sewage built up and stagnated in this sewer. The system became dangerous for those living along it and especially near its outfall. Sewage begins to produce sulfides when exposed to anaerobic conditions, meaning bacteria in the sewage have consumed all oxygen available. Not able to oxidize, sulfides combine with hydrogen in the wastewater to produce hydrogen sulfide – emitting a rotten-egg odor. When pipes are partially full, aerobic bacteria above the pipe's water line oxidize the hydrogen sulfide and produce sulfuric acid (Palmer et al, 2000). Under Daniel Freeman's ranch the sewage had reached this septic state and eroded the mortar holding the outfall together. To reduce anaerobic conditions, the city engineer's office added a few ventilation holes along Freeman's property (Sklar, 40). The release of any stench irritated Freeman. He complained, but no changes were made.

At the same time, a strong storm forced the portion of pipe lying along the ocean floor out of alignment. This channel of sludge created on the beach came to be known as "Brown Acres" (Sklar, 40). By 1902, voters had finally approved a $1.5 million bond measure for a new outfall, the "Central Outfall". At the site of the new outfall pier washouts were common due to the submarine canyons of Santa Monica Bay which had not yet been discovered (Sklar, 49). And here we see the cycle previously described by anti-sewer activist Amy Rockefeller. Sewers lead to water pollution. Water pollution leads to larger sewage systems, and these systems create a larger and more hazardous pollution site.

The unknown contents of the larger concentrations of sewage concerned public health officials. As early as 1900 the California State Board of Health objected to the sale of sewage for

irrigation (Sklar, 42). Nevertheless, the city continued to profit from some sewage sales to local farms and the ordinance was not enforced. Sewage farms operated in the area until the 1940s, and even then, according to a report published on sanitation practices in Los Angeles published in 1952, “aesthetic considerations rather than threats to the purity of the water supply or other health factors,” resulted in some farm closures (Sklar, 43). At the time of farm closures, repurposing sewage had not produced any measurable health effects, yet public officials believed that the sewage could not be reused. They believed it should instead undergo a series of treatments before disposal. Despite the pleas of public health officials, the city did what it could to keep its sewage pipes from backing up and continued to sell it byproducts. Rather than a following a scientific study, only an idea of sewage danger and food purity kept the city from reselling sewage as fertilizer. Perhaps the separation of citizens from their sewage through the 1900s created this perception of sewage as pollution rather than sewage as byproduct or sewage as fertilizer.

In 1905, the city governance structure began to change. The progressives at the time instituted a Board of Public Works to appoint a City Engineer rather than the previous s by election. During the same period, Los Angeles started hiring its own employees to construct the sewer rather than relying on subcontractors (Sklar, 52). With the direct hiring of employees came an even larger role for the city government in implementing a sewage system.

All the while, the city continued to grow. Aligning construction of the new outfall with the objectives of the Pacific Electric Railway company, Pacific Electric Railway established its Hyperion commuter stop in 1905 as well as a smaller industrial stop to transport bricks and other supplies for the construction of the outfall. Eli Clark and Moses Sherman, presidents of the syndicate, selected the name Hyperion to refer to the Greek god, father of sun and the moon.

Workers at the station joked that the name was chosen because Hyperion was the son of Uranus, a crude (and hilarious) allusion to the sensitive objects of the infrastructure they constructed (Sklar, 49). Hyperion then also cemented itself as a piece of the massive suburbanization of the L.A. area, As the yet to be incorporated cities of El Segundo and Inglewood would thrive because of this new streetcar infrastructure (Nordstrom, 21), new residents and beach goers would begin to interact with the immense pool of sewage and skid of sewage grease leaving the Dockweiler Outfall daily.

Before the Central Outfall would be completed in 1906, the California State Board of Public Health ordered the city to halt dumping at the Dockweiler Outfall because of the odors affecting surrounding communities. The miasmatic theories of the Board echo those of Chadwick in London. The City Board of Public Works halted the dumping momentarily but started again within weeks because there was nothing else it could do with the onslaught of sewage perpetually pumped into the system (Sklar, 53). By 1907, the Central Outfall had entirely replaced the Dockweiler sewers and sewage would finally be able to be dumped further out to sea.

The outfall did not extend far out to sea, however, and in January of 1913, the California State Board of Public Health reported horrible conditions once more at the Central Outfall (Sklar, 55). But these conditions were not necessarily concentrated at the outfall. After particularly bad rains, sewers would flood into the streets throughout the city, stormwater leaking into the system. The central outfall had also become overwhelmed, especially due to the L.A. basin's torrential rains. Around the same time the City Engineer proposed a North Outfall for the city. The initial measure was rejected by the city. According to Sklar, "the far-flung nature of (Los Angeles's) suburbs worked against any civil consensus on sewer construction, especially in

a time when the majority of voters were registered Republicans and known for their fiscal conservatism" (Sklar, 57). Similar to the war Chadwick fought with decentralizers in England, voters in L.A. seemed to fight against a centralized system. In contrast to Chadwick's England system, the voting population in L.A. was already dependent on that system. They did not vote against a new outfall for the purpose of entirely decentralizing sewage, for their previous voting and living conditions predisposed them to a "modern" sort of sewage system. In hindsight, these votes only served to worsen conditions along sewage lines and prolong necessary fixes.

In 1916, the California State Board of Health again instructed the city to fix issues with pollution around the central outfall. Once again, the city demurred. In line with voter complacency to worsening sewer conditions, beach goers continued to swim in the waters around Venice and Manhattan Beach. And during World War I, city residents were even less likely to consider spending money on public works for the city, feeling overwhelmed by the war effort (Sklar, 57). The danger created by the modern sewage system went unchecked until after the war, when the city finally approved over $100,000 to reconstruct the outfall. Meanwhile the public debated what to do with the sewage. Many citizens favored separating water from the sewage for irrigation and using the solids as fertilizer. Some called for an activated waste plant like that which already existed in Pasadena, hoping to extract necessary water from the waste. Others called for disposal into the ocean, or even hazardous waste sites. There was no popular consensus on the dangers posed by large-scale sewage systems or how to manage sewage once concentrated.

Around 1920, the problems with sewage began to flood more readily into the public consciousness. In the winter of 1921/22, during torrential rains, the streets of LA were inundated with stormwater and sewage. Manholes would become so pressurized with sewage and

stormwater build up that they would burst, creating small sewage geysers (Sklar, 63). The movie industry, which released a massive amount of water into the sewage system to process film, released “The Film with an Odor” in partnership with the city to describe and promote the plans for a new outfall and treatment plant. With the galvanizing support from the movie industry and the *Los Angeles Times*, the bond measure to construct an entirely new outfall and treatment plant passed in 1922 (Sklar, 65). The potential violence posed to residents by the heavy concentration of sewage under septic conditions was “decoupled from its original causes by the workings of time” (Nixon, 6), and thus bred a happy ignorance among sewage system utilizers.

Los Angeles’s public resources and infrastructures continued to expand. By the 1920s the city began to incorporate private communities in the surrounding areas. The small sewage systems and cesspools created by these communities were then considered “health hazards" to the city, so it built pumps to send private sewage to the municipal system (Sklar, 69). These small communities, with smaller cesspits of their own, contrasted the “modern” sewage paradigm set in place by the city, and households were still required by the city to connect to the municipal system. Los Angeles’s system continued to grow. In a 1923 routine capacity survey, the city found that each aspect of the municipal system was overtaxed. Because of the motion picture industry’s heavy water usage, the city decreed that individual studios must construct their own private sewage systems (Sklar, 70). Additionally, as a temporary solution the city dumped sewage into Ballona Creek, which consequently began to flood the Venice canals just north of the central outfall.

To start to rectify the “brown acres” which had been accumulating near the central outfall on Dockweiler beach, the first actual screening plants were under construction at Hyperion and placed in operation on April 13, 1925. The plant concealed pipes and screens under a Spanish

mission style architecture. According to Sklar, “The sewage screening plants were just another stage set to romanticize the treatment and disposal of millions of gallons of raw sewage” (Sklar, 72). The Spanish Mission style screening plant appealed to the glitz and glamour of the Hollywood 1920s, all the while commenting on the colonial history of the site. Oongovanga still existed there amidst the pool of feces and Spanish architecture. Instead of examining the original site as a “stage set,” however, I think we can learn from the extravagance of public monuments designed to be experienced, or at least admired for their aesthetic beauty. The intricacies of the old plant architecture at least allude to the baroque and sensual architectures promoted by those like Pallasmaa, but perhaps these sensual architectures deliberately detract from the sensorial experience of our wastewater infrastructure instead of promoting it.

By the end of 1925, the outfall again began to fall apart, and the screening process was just as messy. Sewage was seen all over beaches (Sklar, 75). Bacteriology tests run by the California State Board of Public Health showed heavy presence of *Balantidium coli* or B. coli, an intestinal protozoan parasite, along the beaches, and the sewage field continued to grow in a slick that could be seen stretching all the way out to the ocean (Sklar, 77). Screenings at the time were dumped in the dunes behind the plant and underwent an acid treatment to kill flies attracted to the smell of the screenings (Sklar, 78). By 1933, the plant had begun burning the screenings as the dunes around the plant had become overtaxed (Sklar, 96). The history of Hyperion is a history of incineration, of disregard for coastal ecological health, and the bacteriological consequences of large-scale sewage concentration.

Many of these problems however were addressed during the progressivist renaissance of the Great Depression. During the 1930s millions of federal dollars were spent on municipal

public-works projects. Part of this spending was used on excavations of the screenings dumped in the dunes around Hyperion in 1938. These screenings were barged out to sea (Sklar, 96).

In 1938, the city's attention was once again redirected to the drama of sewage infrastructure when manholes, pressurized by the heavy rains of that winter, began to burst into brown-acre geysers. The public had accepted cognitive dissonance in their treatment of human waste as pollution or dirt, continuing to utilize heavily polluted beaches throughout the first half of the 20th century (Sklar, 102). Every moment the sewage has flowed, we have processed and enacted these dissonances for the sake of participating in a modern sewage paradigm.

A report published by the California State Board of Public Health in 1942 did not find any harmful bacteria in the sewage sludge and grease covering the beaches near the Hyperion plant. No typhoid. No cholera. The report did indicate that some mothers noticed their children developing different sorts of dysentery after their trips to the beach, but only the communities based directly on the water really complained of the pollution (Sklar, 103). Despite the lack of evidence of harmful bacteria, the State Board of Public Health chose to quarantine Dockweiler beach adjacent to Hyperion, but the public still used the heavily polluted beaches on either side of the quarantine zone (Sklar, 104). Like infrastructure visibility, pollution visibility depends on who you ask, and perhaps the history painted by the newspapers and official documents of the county do not adequately illustrate who was the most affected by this pollution. That said, public attitudes towards danger conflict with official readings of that danger but also support them, or vice versa. A few cases of dysentery could be justified by the public, trusting the health department's read on "harmful bacteria." This period of public health also demonstrates the shifting attitude from a perceptive or instinctual idea of pollution to an acceptance of allowable limits for pollutants determined by official agencies.

Somehow coexisting with a public indifference towards the danger sewage poses there's a certain excitement, or train wreck-like fascination with how we approach the danger from sewage pollution. The local newspapers reported on the engineer who braved his life and navigated miles of hydrogen sulfide gas filled tunnels (Sklar, 98). To inspect the Los Angeles sewers, in 1938 Reuben Brown, the assistant superintendent of sewer maintenance, went on the first trip through the sewers using a specially outfitted boat and hazmat suit to examine spalling – cracks in concrete pipes usually started or worsened by sulfuric acid build up. Even hearing the stories now, I'm holding my breath. There's a disgusting yet romantic mystique surrounding the inner workings of these systems. Unrolling infrastructure's hidden and dangerous facets, thenceforth unearthing the invisible aspects of the infrastructures, makes poignant the invisible of the entire system of infrastructures.

Given infrastructure's reluctance towards newness and tendency to latch onto pre-existing infrastructures (Star, 611), it may not surprise that the sewage treatment process currently used at Hyperion is not new. In 1940, a similar if smaller-scale system was built in Griffith Park. City Engineer Ray Goudy started a successful water reclamation plant for some sewage taken from the North Outfall in Griffith Park, which included settling tanks for sludge, anaerobic tanks to process that sludge which would then be sold as fertilizer. Sewage water would be filtered, chlorinated, dechlorinated, and then returned to the LA River (Sklar, 95). At the same time, Hyperion maintained the backwards screening process outlined above, and not all residents of the city had hooked up to the central sewage system. During the early 20th century, small-scale cesspools' water would still percolate back into the water table, filtered by soil (Sklar, 95). In this way, most small communities enacted a small-scale, rough-water reclamation. These communities filtered and sanitized their sewage in a similar manner to the process

completed after Goudy dumped reclaimed water back into the Los Angeles River, except important nutrients in sewage would then be returned to the earth.

Towards an Infrastructural Sensibility

Reaching towards the mid-1900s, large-scale sewage infrastructure became the norm. As a counterpoint to the small-scale ecological infrastructure still practiced by city residents, planners continued to experiment with their large sewage system. The planning experts during the 1940s made predictions for the city's population, noting that population growth would overwhelm the city's then current sewage infrastructure. After World War II the city found itself with an excess of municipal bonds, allowing for the construction of new sewage infrastructure. A debate between the City Engineer and the City Planning Commission ensued as to where to place a new sewage treatment plant. Despite the City Planning Commission's plan to create a large, interconnected seashore residential and recreational area uninterrupted by hazardous infrastructure, similar to the planned community of poets and writers imagined by Huntington, Clark, and Sherman of Pacific Electric Railway (Sklar, 107), the City Engineers intended to build the plant by the seashore. The City Engineer's force of will overwhelmed the planning department, and with the financial force generated by the municipal bonds, the city created a monument called Hyperion Wastewater Treatment Plant.

During construction, the treatment plant was praised as the "World's Finest" (Sklar, 109). The sewage treatment process was similar to today's Hyperion: automatic bar screens would remove large objects from the sewage. The remaining material would be sent to settling tanks where clean water is discharged as sludge settles. Main flow would then head to grit removal tanks for inorganic materials. After chlorination, the sewage would head to more settling tanks

for two hours, where grease and oil would float to the top, then be skimmed off, while organic solids were removed again from the bottom. This sludge would travel to 18, 30-foot-tall anaerobic digester tanks. The remaining material would be rewashed and sold as fertilizer. The gases produced in anaerobic digestion would be vented out of the tanks. The remaining liquid would then travel to aeration tank where some sludge would be added. Oxygen in the air would allow the aerobic bacteria in the water to feed on the suspended solids. Aerated water would travel to clarification tanks. Engorged bacteria would settle and be removed (Sklar, 109). This process at Hyperion was up and running by 1951 (Sklar, 112). \

Persistent smog emanating from the plant caused the Board of Public Works to transfer supervision of the plant from the Bureau of Engineering to the Bureau of Sanitation, with little impact to the plant (Sklar, 113). However, the shift signaled a general shift happening to public works in the city, transferring power from the once all-powerful City Engineer to boards of professionals in other fields.

In 1952 the Los Angeles Regional Board began keeping records on the city's sewage treatment performance after another winter with heavy rain and heavy sewage flows. According to an interview conducted by Sklar with Frank Wada, a city engineer at the time, during the breaks for "I Love Lucy" all television watchers in Los Angeles would rush to their toilets and manholes throughout the city would burst. The solution at the time was to park trucks over the manholes, thereby sending sewage back up into people's homes. The longer-term solution was to let some sewage enter the LA River. By March of 1952, expanding sludge beds lined the riverbanks (Sklar, 114).

Nevertheless, by the 1950s, Hyperion became perceived as a major success. Aldous Huxley in *Tomorrow and Tomorrow and Tomorrow* described the process taking place at

Hyperion: “The problem of keeping a great city clean without polluting a river or fouling the beaches and without robbing the soil of its fertility has been triumphantly solved. The Hyperion Activated Sludge Plant is one of the marvels of modern technology” (Sklar, 115). The plant, however, was not perfect. Foams and suds from the manufactured detergent ABS did not biodegrade and thus produced suds in the aeration tanks of the plant. Billows of foam floated over El Segundo carrying pathogenic bacteria and grease (Sklar, 115). Stenches from aeration tanks and gas collected from digesters besieged the surrounding area (Sklar, 116). The plant worked hard to mask these odors.

The architecture of the site partially distracted from its inner workings. The plant’s architectural functionalism attempted to blend in with the surrounding sand dunes (Sklar, 116). Joe Nagano, the manager after the plant was finished in the 1950s, spoke of the beauty of his vistas of the plant, which were lost after a new administration building was built ten years later (Sklar, 120). Systems duties eventually conflicted with aesthetics but in its original conception, the plant was intended to be beheld.

The system was still overtaxed, unable to filter and sell sludge fertilizer. So, the Valley Settling Basin in Griffith Park was built in 1954 to allow solids to coagulate, be removed, and later be pumped back into the system in low flow. This eased the solid flow heading to Hyperion. This settling basin was the predecessor to the Los Angeles Glendale Plant, erected in 1976 (Skar, 116).

The city still looked for ways to ease the burden on the Hyperion plant. After the settling basin was completed, representatives from the California Department of Public Health established a new committee, the Citizens Committee on Sewerage, and began to conduct oceanographic surveys, sediment studies, and topographic details of the ocean floor to determine

where to put two new longer ocean outfalls: sewage would not require as much secondary treatment (Sklar, 119). The plan proposed by the committee was approved for municipal bonds in 1955 (Sklar, 119). The new seven-mile outfall, completed in 1957, deposited primarily treated sewage west of the Ballona Creek Delta. Marine Life around the cavern died off (Sklar, 123). Another one-mile outfall was used for emergencies or events where the seven-mile outfall could not be used.

In the original plant design for Hyperion, sludge would be washed to remove alkaline components and ammonia before filtration. Particles of sludge would be washed out with effluent through the original central outfall and would settle to the bottom of the ocean. After the new seven-mile outfall was completed, the sludge filtration process was abandoned, leaving the seven million dollars of equipment used in washing, filtering, and drying the sludge to sit and loom over the rest of the plant. The seven million dollars of sludge treatment equipment was decommissioned, but the buildings which housed these processes stayed on site until the 1990s. “These buildings were especially popular with Hollywood location scouts in the late 1960s and early 1970s. *Planet of the Apes* (1968), *Soylent Green* (1973) and other movies used these buildings and other parts of the plant to establish the menacing quality common in science-fiction films of the era" (Sklar, 123). Moviemaking sheds light on the supermodernity of the plant aesthetic. We associate the 1950s functionalist architecture of concrete and pipes with retro futurism, with a dystopian modernity beyond our own. Simultaneously the dystopian modernity we observe often only comes to us through motion pictures, through their optical hegemony.

In May 1956 the California State Board of Health set new standards and rules for the protection of “beneficial” water use in Santa Monica Bay (Sklar, 125). Leading into the 1960s American consciousness of pollution began to change. The ways in which the municipal sewage

system disposed of various pollutants began to be exposed. The city found alkyl benzene sulfonate (ABS) lingering in the ground water table, rivers and streams and thus decided to install a special grease-skimming system at Hyperion to combat the grease latching onto ABS suds. From 1947 to 1971 the largest manufacturer of DDT in the world at the time, Montrose Chemical Corporation, operated in Torrance, California on South Normandie Avenue. The city had allowed the discharge of DDT contaminated waste into the sewers from 1953 to 1970 (Sklar, 126) during which an unknown quantity of DDT traveled through the plant. Towards the end of the 1960s, tragic events piqued environmental consciousness. On January 8th, 1969, Well A-21 at Union Oil's Platform off the Santa Barbara Coast blew out. Over 200,000 gallons of crude oil spilled into the coastal waters, polluting the Santa Barbara beaches.

Despite growing levels of pollution awareness, the city still conducted some practical yet heavily polluting measures. A new pump was installed at the overtaxed Hyperion to help with heavy flow. During power outages the pump would stop, and partially treated effluent would exit through the one-mile pipe. In 1961, the city installed an emergency bypass structure at Jack Avenue overlooking Ballona Creek. The structure was used for 25 years during heavy rains (Sklar, 132). Because of the centrality of sewage to our "modern" existences, and the cognitive dissonance forced upon any sewer user, the sewage mess which continued to emanate from Los Angeles's sewage system remained unquestioned in the public eye.

Still, city engineers and the Board of Public Works imagined a friendlier future for sewage treatment. In 1967, the city started a design for a glamorous new treatment plant at the Sepulveda Basin to accommodate San Fernando's increasing population. As a buffer between the plant and the neighboring suburban community, the plant would include a Japanese Garden with a lake and a meandering brook full of reused effluent. Golden Gate Park in San Francisco

watered its trees with reclaimed sewage water, and Los Angeles city engineers felt inspired to do the same (Sklar, 134). This conception of a sewage treatment plant differed from the standard set by Hyperion. This plant aimed to be a location where users might come and sit.

The aesthetic of a clean and sleek sewage treatment process in the Sepulveda Basin juxtaposed the polluted concrete and piping at the Hyperion plant. In the early 1970s a battle ensued between Los Angeles officials over state and federal requirements for improved sewage quality. In 1969, with the Porter Cologne Act, the California legislature set strict standards for discharges into the ocean, requiring the removal of heavy metals from sewage before reaching plants, full liability for clean-up costs on the city, and strict fines for city noncompliance (Sklar, 138). Following the precedent set by the Porter Cologne Act, the Environmental Protection Agency or EPA, passed by President Nixon in 1970, set new limits for water pollution and set aside four billion dollars for improved water treatment facilities. The act also required the monitoring of biochemical oxygen demand (BOD) at facilities, indicating aerobic bacteria levels in effluent after final treatment. The federal government, empowered by the new EPA, withheld funding for new wastewater infrastructure until full secondary treatment had been implemented at Hyperion (Sklar, 139). The city was not sure whether to cease dumping primary treated effluent into the bay and lacked the resources to change treatment immediately.

Commissioned by the region, the Southern California Coastal Water Research Project (SCCWRP) conducted a three-year report examining the Central Outfall, concluding that dumping of sewage does not harm the marine environment in 1973 (Sklar, 142). Meanwhile, the city engineer Donald C. Tillman, empowered by the report and not believing sludge to be harmful for marine environments, developed a plan called “Desert Bloom” to send sludge to the Mojave Desert (Sklar, 142). The Federal government would not let the city progress on the new

Sepulveda Water Reclamation Center until substantial progress had been made on a new facilities plan for full secondary treatment (Sklar, 143). City Council members also disagreed with the federal initiative and sided with the city engineer. The city then failed to make progress on plans for both plants.

As if to justify the city's stalling, a new amendment in 1977 to the Clean Water Act of the EPA allowed cities to apply for a waiver from full secondary treatment if the city has a deep ocean discharge (Sklar, 146). It was found, however, in 1977 that the city had been violating regional water quality standards. The Regional Water Quality Board reported that Hyperion plant wastewater exceeded daily discharge standards for arsenic, cadmium, mercury, ammonia, cyanide, and biological oxygen demand, and release of oil and grease (Sklar, 147). Hyperion the physical plant during this time continued to deteriorate. Maintenance was not a priority. Engineers rarely supported requests from the plant for maintenance. Jack Betz, the sanitation Bureau director, was a notorious penny pincher (Sklar, 148). As a result, Hyperion experienced more than 30 emergencies in 1984 requiring the plant to discharge partially or untreated effluent from the one-mile outfall. The city's request to be considered for the EPA's waiver was denied in 1985 (Sklar, 150).

In 1985, Dorothy Green, part of the Coalition to Stop Dumping Sewage in the Ocean, tried to dissuade Santa Monica city support of the waiver request to the EPA. Santa Monica then also voted to oppose the city's waiver request (Sklar, 180). The director of the Southern California Coastal Water Project (SCCWP), William Basom, disagreed with the organizers of the coalition, arguing that the fish population had been enhanced by the "food" discharged into the bay in the form of sewage (Sklar, 180). On June 2nd, 1985, the Coalition to Stop Sewage Dumping held a rally of 100 people who marched around City Hall in various marine animal

costumes (Sklar, 186). That summer also saw multiple leaks coming from outfall to Hyperion, the first occurring at Ballona Creek, which the Coalition used as publicity stunts for their cause, holding press conferences at leakage sites often before the city had diagnosed the leakage.

Meanwhile the city scrambled to remove sludge from the Hyperion facility. In 1980, the city formulated a program called HERS to dry sludge to a fine powder and then burn the material to produce energy for the plant. The city agreed to the regional water quality board that as a part of its plan to manage sludge at Hyperion they would implement HERS by 1985. As 1985 approached it became clear that the city would not reach this deadline (Sklar, 189). The city met problems from its other facilities. The Tillman Plant in the San Fernando Valley which was supposed to open in 1985, delayed its opening upon the realization that chlorinated effluent leaving the plant was killing fish in the Los Angeles River (Sklar, 191).

Throughout 1985, as the city began to bring environmentalists from the Coalition to the Board of Public Works and into the mayor's office to discuss potential solutions, the spills at Hyperion continued. Later that year the city was again denied the waiver to allow only primary treated effluent through the seven-mile outfall (Sklar, 192). The city found itself in a sort of paralysis with the application for the waiver from the EPA, not knowing if they would have to construct a secondary treatment facility or not (Sklar, 195). According to Sklar, the city finally cured itself of this paralysis by hiring a consultant named Don Smith to assess the current performance of the plant. Smith suggested modifying the existing organizational structure of the plant as well as some modifications to the physical infrastructure of the plant. “Heal the Bay” renamed from the Coalition to Stop Dumping Sewage in the Santa Monica Bay became partners with the city and were given “friends of the court” status for sewage decisions (Sklar, 195). In

1989, 1988, and 1992, LA voters overwhelmingly approved billions of dollars in sewage improvements.

The HERS program was finally operational by 1989 but immediately faced setbacks. HERS could not handle all of the sludge produced at Hyperion. The city then began taking truckloads of sludge to the West Covina landfill and Chiquita Canyon landfill (Sklar, 201), while some of the sludge was being sent to a diversified beneficial use program, meaning it would be given to farmers for use as compost. New technology began to fail its promise at Hyperion. The hydro extractor, or process which dried the sludge, kept breaking down.

El Segundo residents worried that the HERS plant would produce more smells for the plant (Sklar, 146), and as El Segundo residents predicted, heated gas that vented out of the tower violated air quality standards. Additionally, the HERS program represents what could be considered a peak in the history of danger at Hyperion. In 1988 during testing, the hydro extractor produced a fireball which engulfed two workers. In the brief HERS run, miasma produced by sludge was transformed and re-released out of the HERS tower, and the process used at Hyperion was made even more dangerous. The facility switched back from the HERS program to steam driers in 1994.

By 1996, most sludge from the plant traveled by truck to the 4600-acre ranch in Kern County, “Green Acres" for land application. As of 2008, no studies of the consequences of land application of sludge had been completed (Sklar, 204). The municipal, state, and federal governments agreed to refer to the sludge produced from heating in digesters as “biosolids.” These “biosolids” are “well below federally mandated limits for such heavy metals as arsenic, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium and zinc with no detectable amounts of PCBs or dioxins, measured at parts per billion, and they meet Class A

requirements for pathogens" (Sklar, 205). Kern County has hoped to oust the ranch from the city, worrying that the water table would eventually be contaminated by the biosolids (Sklar, 206). The public remains wary of the long-term effects of biosolid applications, and anti-sewer activists maintain that pathogens can regrow in Class A sludge (Rockefeller, 343). They also maintain that the claims that biosolids do not contain substantial toxics are incorrect or at least misleading ("You say biosolids, I say sewage sludge", SourceWatch.org). Reusing sludge does offer substantial benefit to farmers, however providing a cheaper and more effective alternative to most fertilizers (Cioca et al, 2021). Hyperion in 2021 still shuttles biosolids from digesters to the Green Acres farm. Truckloading facilities in the center of the plant streamline the process. At Hyperion, in the physical space where biosolids are constructed, we behold dialectical notions of pollution and benefit. We continue to produce biosolids despite their potential toxicity, and we continue to produce biosolids because of their efficacy as a fertilizer.

The dangers of concentrated and untreated sludge, however, are clear. The area below the seven-mile outfall had become severely degraded. The sludge outfall had built up for decades, undispersed by currents. Too much organic matter accumulated, unable to be broken down by biological processes, creating sulfide sediments and oxygen lacking environments, leaving only a few species of small marine worms and a stomach-less clam remaining (Sklar, 202). This ecological destruction has been indirectly guided by a debate over the very idea of sewage and its utility and the subsequent and often floundering policy which attempts to control it.

By 1998 the city had finally begun full secondary treatment of sewage and by 2008 the Hyperion plant had continued to increase capacity despite limited acreage. Air emission controls and odor-scrubbing elements keep the air in Playa del Rey and El Segundo "clean enough that the surrounding multi-million-dollar homes maintain their value" (Sklar, 206). In our modern

conception of sewage treatment, mitigation of these odors is a crucial aspect of a well-operated sewer system.

Today's wastewater systems have also begun to reconcile their histories of ecological destruction. The average sewage service charge for residents was $28 in 2008. With that money the city conducts supplemental environmental projects such as wetland and stream restoration programs as well as more routine maintenance: the replacement and cleaning of sewer lines, constituting programs to control pollutions from city streets, improved enforcement of grease discharge standards from restaurants, as well as routine inspections and reports of sewage pipes and plants (Sklar, 207). Hyperion currently operates with a lower carbon footprint thanks to the Digester Gas Utilization Project, which has successfully and sustainably implemented a 27 MW BioGas facility created by Constellation Energy Company, eliminating the plant's dependence on the grid (sustainableinfrastructure.org, 2018).

Public presence and outreach have become an instrumental aspect of advertising for and ensuring public support for wastewater treatment projects. In a YouTube video released by Constellation Company, brightly colored and high-resolution shots take glimpses into the plant while an interview is conducted between Traci Minamade, the chief operating officer at L.A. Sanitation, and an unnamed presence behind the camera. The top comment in the comments section of YouTube reads: "I drive by the plant and I always wondered how this works. Amazing!" Los Angeles, like other cities in the United States, has addressed the disposal of sewage through a series of infrastructural interventions that revolved around a centralized system. Each facet of the infrastructure's complex inner workings contains complex and conflicting perspectives.

Digital Conceptions of Hyperion

The Los Angeles Sanitation and Environment website is an outdated cyber infrastructure. The Hyperion Treatment Plant tour and history sections of the website are listed on a ribbon to the left of the website in medium-sized arial font. They portray the sewage treatment process matter-of-factly ("Hyperion Virtual Tour"). The process which has resulted from dialectical and often absurd history is reduced to discrete parts in an arial font.

The website depicts three parts of this process that connect and interact as the effluent progresses. In the pretreatment process the largest solids are removed. Eight bar screens (large metal racks of steel bars spaced ¾ inches apart) collect these solids from effluent pumped at about two-feet ft per second, while large mechanical rakes "remove unwanted materials" from the bar screen. The large solids are taken to large silos where they are "dewatered" before taken to landfill. The effluent water then flows into a trough. According to the website, these materials are not recyclable. The screens are not contained in a beautiful Spanish colonial ranch but instead a brutalist concrete imposition. From the trough, the travels travel to an aerated grit chamber for sand/grit removal. Sand and grit are abrasive, and therefore would erode various downstream pipes in the water treatment process. Tanks containing the liquids are aerated to suspend organic materials while sand and heavier grit settles to the bottom. Massive pumps remove the sand which heads to the handling tower where it meets the same fate as the larger objects: they are sent to the landfill.

In primary treatment, wastewater slows to two to three feet a minute. Primary tanks are three hundred feet long, and fifteen feet deep. During this two-hour hold in primary tanks, heavy solids settle to the bottom while oil and grease float to the top. According to LA Sanitation and Environment, chemicals are then added "to allow more particles to bind together and settle."

After the grease and oil are pumped out of the effluent, the plant tests the Biochemical Oxygen Demand (BOD) and performs the "necessary adjustments" to reach the required state level. The effluent then heads to the Intermediate Pump Station to prepare for secondary treatment.

In covered oxygen rich reactor tanks, bacteria living in wastewater consume most of the remaining organic particles, then bloated, they settle to the bottom of the thanks. These bloated bacteria are pumped from the bottom of the tanks and sent to clarifiers for final settling. Then for the showstopper, the solids travel to digestion and solid handling, meaning they are pumped into huge egg-shaped vessels. Anaerobic bacteria thrive there, continuing to eat biosolids and "destroy pathogens," all the while releasing methane gas. Unmentioned in the treatment plant tour, this methane gas is recaptured by the BioGas plant.

The process is reiterated later in the LA Sanitation and Environment website with an aerial map of the plant, highlighting each section of the plant as the tour progresses. The Hyperion tour leads you through the general treatment process of the plant, from headwaters to ocean outfall. The tour even adds some tidbits which are not explained in the "Process" section of the website. The aerial tours add information about a cryogenic air separation facility which pumps liquid oxygen into the effluent for secondary treatment, as well as a pump which sends methane to the Scattergood facility. The Scattergood facility was decommissioned in 2017, presumably after the last update of the Hyperion Plant tour ("Scattergood Power Plant Decomissioning"). This pump must now send gas to the Constellation BioGas facility (Snyder, 2014).

Even with these fascinating additions, to me, the tour feels incomplete. It does so because it does not explain the functionality of a large portion of the plant. Many of the buildings are left unaccounted for. Below (see figure 2), the white polygons show the portion of the plant

explained in the tutorial, while I've laid black polygons over the rest of the plant using Adobe Illustrator. Figure 3 replaces these polygons with question marks.

Fig. 2. Unexplained areas of Hyperion in black from: Stone, Billy. 20th October 2021, Author's personal collection

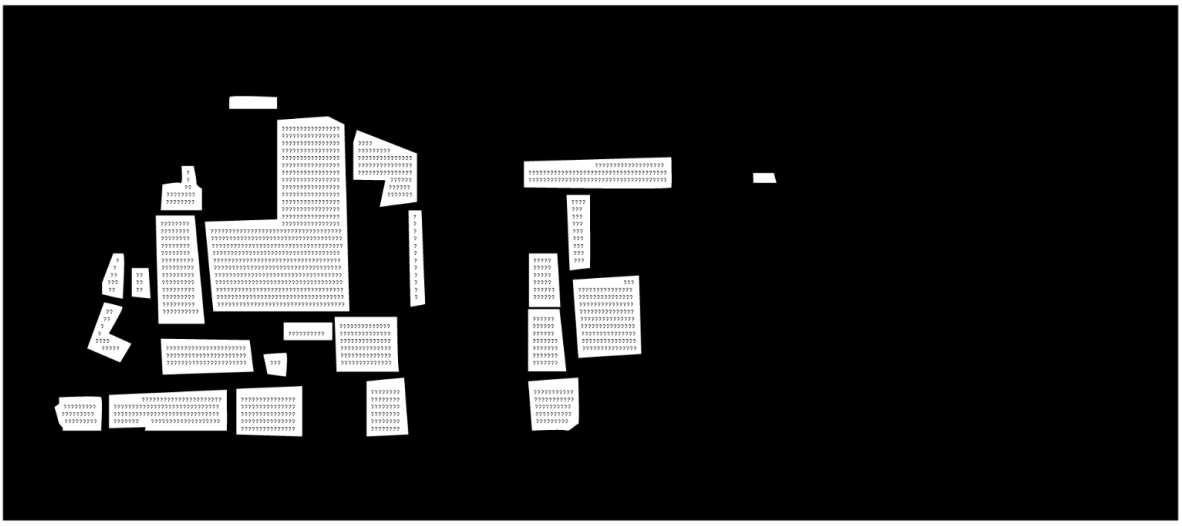


Fig. 3. Unexplained Areas of Hyperion highlighted with question marks from: Stone, Billy. 20th October 2021, Author's personal collection

The website does not fully explain Hyperion. Recall that conceived space refers to any mental activity about physical space. In this way the website fails to fully conceive Hyperion. The spaces within the black rectangle above are left entirely empty in the imagination of website

reader. The “unexplained” becomes the “unconceived”. One cannot then connect the history to each building of the plant. This website tour also does not include conceptions of Hyperion beyond those immediately useful to engineers, or observers who want to simply understand the discrete steps of the sewage treatment process. The conception of space advertised by the Los Angeles Sanitation Website illuminates some aspects of the treatment process. We are left with questions. The incomplete nature of this illustration I believe draws attention to the dialectical nature of infrastructure conception. At each node in Hyperion’s history differing ideas about what Hyperion should do competed for hegemony. Today contained within the objects of the infrastructure, complete hegemony does not exist. Only within these conceptions does any dominant, technocentric idea of infrastructure exist. Sludge, or biosolids today, were and continue to be debated over as hazardous or helpful, dirt or not. Yet they continue to be produced and applied to the Green Acres farm, and the Hyperion tour explains this matter-of-factly without reference to controversy (The controversy is lightly touched up in the “biosolids” section of the L.A. Sanitation and Environment website).

The creation of sewage does not pause for these conceptions of Hyperion to be made. The dynamic process is conceived as the infrastructure operates. The conception is then integrated into the function of plant. This integration between conception and operation brings us to the final moment of Lefebvre’s triad: Lived Space, which transcends the bounds of perceived and conceived.

Moment 3: Representational Space / Lived Space

Recall that Lived Space is the meaning derived from space "that people recognize and experience as significant beyond themselves as individuals" (Carp, 135). In an urban planning context, Carp took this to mean one's sense of place in each space (Carp, 136). Accordingly, sense of place appears to be the most salient interpretation of Lefebvre's "lived space" that we can apply in a planning context. Many scholars report an ambiguity between the three aspects of Lefebvre's triad. Lefebvre joined the French Communist Party in 1924 but was later kicked out for his unorthodox interpretations of Marxism. He maintained a radical loyalty to Marxist dialectical materialism – that social conflict stems from a series of social contradictions and their solutions, rooted in some material foundation – but rejected existentialist thought from his contemporary Jean-Paul Sartre who famously borrowed Lefebvre's methodology. By tracing Lefebvre's intellectual journey we can see that perceived and conceived space emerge as a response to Cartesian dualism, the ideal and the material (Elden, 220). Lived space aims to describe the space of pure subjectivity. The three aspects of space, or "moments" as Lefebvre refers to them, are not just three slices of a spatial pie. The three moments are interrelated, that is they describe different perspectives from which to view the same phenomenon (Elden, 222). In an urban-planning context we might presume that each moment of Lefebvre's triad contributes to another. Conception and perception might signal to the user of a space what sort of place they find themselves in. The user might also have a sense of place completely independent of the two other moments of the triad. The role of the urban planner is to see where there are connections and recognize when meaning transcends a single moment of Lefebvre's triad. An urban planner should be able to encourage and respond to different and dialectical conceptions of space and place.

So, what contributes to an individual's sense of place? Placemaking refers to the process of strengthening the connections between people and the places they inhabit (Project for Public Spaces, 2007). Placemaking in urban planning has emerged from a recent history of focusing on cities designed for people rather than cars. When considering how perception of space contributes to one's sense of place at Hyperion Water Reclamation Plant, I've chosen to examine Hyperion in the context of Jan Gehl's *Cities for People*. Jan Gehl's ideal city is a lively city, a safe city, a sustainable city, and a healthy city. Multiple aspects of this quartet can be achieved with singular interventions, but each urban intervention should work to achieve the ideal city. With Gehl's insights we can provide the foundation for a reimagining of Hyperion as a place made for people.

Hyperion and Jan Gehl

Fig. 4. Map of Hyperion with labels from: Stone, Billy. 20th October 2021, Author's personal collection

For a city made for people, Gehl first requires that said city be walkable. In cities dominated by cars, Gehl notices that pedestrians are pushed up against building facades with unwelcome sidewalks which do not allow for multiple uses and are crowded with car friendly infrastructure and signage (Gehl, 122). Vista del Mar – indicated above in figure 4, which runs between Hyperion and Dockweiler beach, is no exception. Though there is a crosswalk from the Dockweiler Beach parking lot, a bus stop, and the appearance of a sidewalk, the nearly three-foot-wide sidewalk makes its priorities clear, as shown in figures 5 and 6.

Left, **fig. 5.** Road work ahead sign completely blocks the miniscule sidewalk next to Vista Del Mar from: Stone, Billy. 4th November 2021, Author's personal collection

Right, **fig. 6.** Towards the LAX Dune Restoration Project, despite a sidewalk, signs prohibit pedestrians from: Stone, Billy. 4th November 2021, Author's personal collection

Dockweiler Beach across the highway from Hyperion is intended for walking. Its vast parking lots signal to its users its intention for recreation. At Dockweiler one can observe other pedestrians. One can park an RV and grill while watching the sunset. People walk, jog, skateboard, rollerblade, and bike along the beach path. The path still falls prey to psychological faults that damper walkability in the area. Built alongside major roads, beach paths subject pedestrians to "tiring length perspective." Pedestrians can see the whole route before them when they begin to walk on the path as shown in Figure 6. For faster moving vehicles this can be a

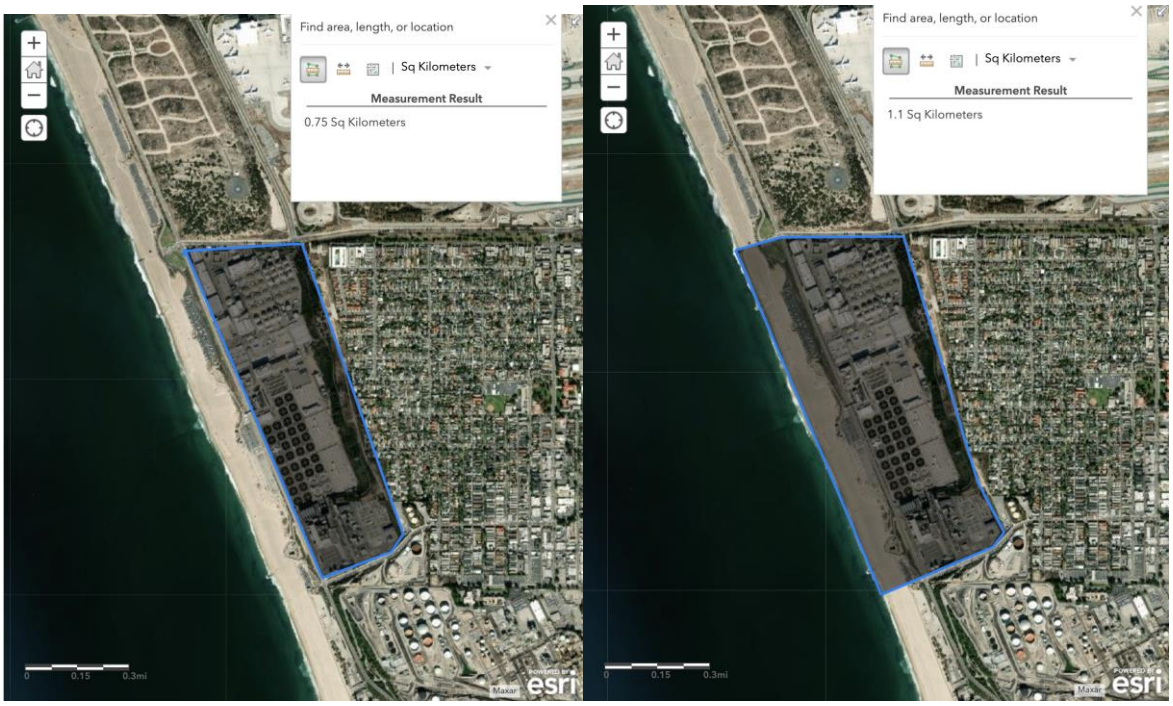
matter of safety, but for pedestrians this creates a sense of fatigue. If the pedestrian constantly walks towards new corners and twists, new vistas unfold before them, and the walk stays interesting (Gehl, 127). That said, there's something special about the exhaustion one feels walking these beach paths or biking as in Figure 7. The exhaustion which communicates the vastness of the ocean, of the coastline as demonstrated in Figure 8. For many pedestrians who use this path for exercise, the length fatigues as it's supposed to. However, I believe we should walk paths which not only stimulate a runner's high, but fill us with a sense of place, an idea that we could sit along the path and watch if we so desire.

Left, **fig. 7.** a biker in full outfit speeds towards the beach from the Ocean Side Café from: Stone, Billy. 4th November 2021, Author's personal collection

Right, **fig. 8.** the bike path continues to the beach, meanders playfully, but continues seemingly infinitely from: Stone, Billy. 4th November 2021, Author's personal collection

In many city centers, the magic size for walkability seems to be one square kilometer. The square kilometer ensures that all main attractions within the center will be walkable, and the walks between them will be interesting. Hyperion, including the section of Dockweiler beach which borders Hyperion measures 1.1 km^2 as shown in figures 9 and 10. These measurements

indicate that Hyperion could not be incorporated as a part of a walkable city center for El Segundo. Hyperion itself is an entire city center. By square kilometers and by facade Hyperion constructs the apparition of a city.



Left, **fig. 9.** This area calculation, conducted with ArcGIS online, shows that the Hyperion Plant measures about 0.75 square kilometers from: Stone, Billy. 10th November 2021, Author's personal collection

Right, **fig. 10.** This area calculation, conducted with ArcGIS online, shows that the Hyperion Plant and Dockweiler Beach measure about 1.1 square kilometers from: Stone, Billy. 10th November 2021, Author's personal collection

Walkability also depends on the facades of the buildings the pedestrian walks by, specifically vertical facade rhythms versus horizontal rhythms (Gehl, 128). According to Gehl, horizontal facade rhythms communicate to a user the same as a walk where you can see the end miles in the distance. They trick the mind into thinking that the length of the walk is longer than it is, or they tell the pedestrian "Please move on" (Gehl, 139). Hyperion has various facades facing towards the road, all of which hide behind a thin layer of vegetation and chain-link fencing. The bright blue chain link next to Hyperion is of a smaller diameter than that which

borders the LAX dune restoration lands to the north. Hyperion's smooth facades devoid of detail (figure 11 and figure 12) also signal to the pedestrian: "please move on!" or "nothing to see here!"

fig. 11. Horizontal facades outside of Hyperion continue for over a kilometer from: Stone, Billy. 4th Novembr 2021, Author's personal collection

Left, **fig. 12.** Construction on the sidewalk bordering Hyperion's horizontal facades from: Stone, Billy. 4th November 2021, Author's personal collection

Right, **fig. 13.** The sidewalk bordering the LAX Dune Restoration Project and Hyperion is uninhabited and extends for miles without break from: Stone, Billy. 4th November 2021, Author's personal collection

As shown in figures 12 and 13, these sidewalks were not made for an average pedestrian, but for a worker tending the foliage next the fence. Construction workers reinstalling asphalt sit on the sidewalk to take their breaks. There is a bridge from the Dockweiler Youth Center parking lot to the plant. Upon my first trip to the plant, I mistook the bridge for an outfall jutting over the street, complete with retro futurist siding. The overpass aims to draw pedestrians from the beach to the Environmental Education Center at Hyperion but comes complete with a revolving gate to block entrance (figure 14).

fig. 14. the walkway over Vista Del Mar could draw pedestrians to the Environmental Education Center, but instead blocks entry from: Stone, Billy. 4th November 2021, Author's personal collection

Vertical facades are also important in city design: they create prospects and refuges. In *Form and Fabric in Landscape Architecture*, Catherine Dee introduces Prospect Refuge Theory. The theory refers to a desire in landscape design to see without being seen. The unmentioned in this sentiment is the desire to see something beautiful. Jay Appleton first postulated Prospect-Refuge Theory in his book *The Experience of Landscape* in which Appleton seeks to understand and universalize our landscape aesthetics. The theory juxtaposes edge conditions which encourage people to sit and survey with expansive spaces which discourage occupation. At and around Hyperion, except for the public bathrooms, Dockweiler Youth Center and the Ocean Cafe, the vast expanse does create many edge conditions. Unless one brings their own RV to the beach the space offers little refuge. By contrast, the site is replete with prospects. What is the ocean if not one of our most immense viewsheds, a water space directly in contrast to land? Across from the ocean we have a monument which begs us to look but hides from our eyes.

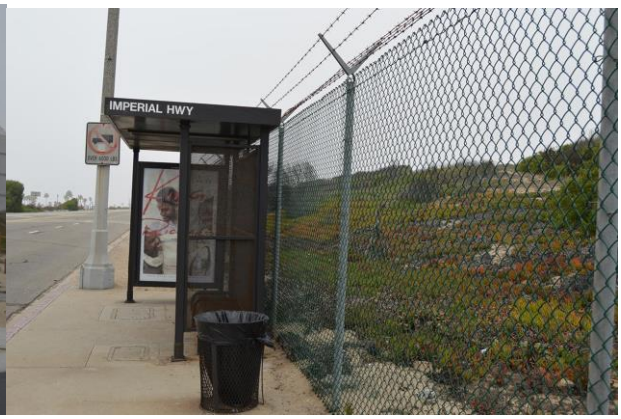
According to Dee there are two types of edges which define space, harsh and soft. In general, we desire soft edges in landscape. Plants "mesh space within their form" and create softer edges. One could conduct an entire research paper simply on the edges used at and around Hyperion. Dense foliage surrounds the bright blue chain link around Hyperion (pictured in figure 15). The foliage is permeable, but the chain link deflects our attention. The chain link topped with barbed wire makes it clear that it is a threshold which is not to be crossed, perhaps correctly contributing to the idea that the reclamation plant is a dangerous place, informed by over a century of sewage related danger.

fig. 15. Peering through Hyperion's blue tinted chain link fence, a vista over the aerobic digesters unfolds from: Stone, Billy. 4th November 2021, Author's personal collection

However, chain link is not the only way to make an impenetrable barrier, and there are boundaries which clearly signal "boundary" but also create vistas. Layers of foliage or changes in elevation between walkway and prospect can block entry while creating vistas. Peering through the chain link on the foggy day like that captured above, one can see the potential for vista. The awe inspired by Hyperion should not be ignored.

Shuttered storefronts similarly signal danger to pedestrians and create an impermeable boundary between outside and inside. These storefronts prevent visual contact between the outside and the inside of private space (Gehl, 151). While the privacy of a space should be considered important, keeping especially ground floor private property livelier is important for creating a compelling, inviting, and safe walking space. We can note that the Ocean Cafe next to Hyperion deliberately faces towards the water and away from the water reclamation facility (figure 18). The back of the building is impermeable, no windows to see through. Even the youth

center orients itself in the same way (figure 19). The buildings are made for looking towards the ocean. Though the bike path passes right next to these buildings, the buildings themselves do not communicate to bike path users that they are a part of the bike path. From my perspective, they're accessible from the bike path but not inviting. Terraces and chairs define city life and without accessible terraces Hyperion becomes lifeless.



Left, **fig. 16.** The only picnic seating at the Dockweiler Beach Recreation Area. Hyperion lingers in the distance from: Stone, Billy. 4th November 2021, Author's personal collection

Right, **fig. 17.** Seating at the bus stop does little to shelter itself from Vista Del Mar from: Stone, Billy. 4th November 2021, Author's personal collection

Jan Gehl also has some criteria for defining attractive seating: Pleasant microclimate, placement with back covered at the edge of a space, a good view, a low noise level, and "no pollution" (Gehl, 140). Gehl does not define pollution here, but at Hyperion hearing and talking become difficult given the high volume of traffic around Hyperion. A background noise level of 60 dB is the upper limit for carrying out a normal conversation at a normal conversation distance, whereas high traffic areas usually have an average background noise of about 72 dB (Gehl, 155). Noise level varies at Hyperion and traffic on Vista del Mar comes in waves. In the immediate vicinity of the road, as by the bus stop pictured in Figure 18 one cannot hear oneself

talk. On the path next to the beach talking becomes more manageable as in Figure 19. However, when the planes from LAX land or take off over the ocean, any chance of being heard is eliminated.

Left, **fig. 18.** The Oceanside Café from: Stone, Billy. 4th November 2021, Author's personal collection

Right, **fig. 19.** The Dockweiler Youth Center from: Stone, Billy. 4th November 2021, Author's personal collection

According to Gehl the city must also be lively. It must enable people to have direct contact with each other, with society around them. In this way the lively city is a relative concept (Gehl, 63): a group of ten people scattered through a square kilometer versus a group of ten people seated on a small terrace. The latter communicates that a space is inviting and popular while the former communicates privacy or loneliness. For the same reason lively cities are self-reinforcing; "people come where people are" (Gehl, 65). Each time I've been to Hyperion the Ocean Cafe sits empty (figure 18). Small tables are only populated by napkin containers, the occasional seagull, and very occasionally a visitor enjoying a breakfast burrito.

To understand the sense of place which Hyperion communicates we also need to understand "shattered scale." Traditionally, organic cities grew around everyday activities centered around a small city square or a walkable distance. That "traditional knowledge about scale and proportions has gradually been lost," Gehl argues, "with the result that new urban areas

are often built on a scale far removed from what people perceive as meaningful and comfortable" (Gehl, 55). We rely today on a scale dictated by automobility. Cars take up a lot of space and move quite a lot faster than our walking speed, shattering a smaller scale of walkability.

One could say that shattered scale in turn forces the visitor into the visual fetishism of modernism described by Pallasmaa: a commodification of images which signals a confusion of space and time. The shattered scale also contributes to a sense of non-place, a node in a travel network, a ubiquitous place not intended for staying. Jan Gehl too takes a harsh view towards architectural modernism. For him, modernism has put low priority on public space, pedestrianism, and the role of space as collective and shared, a meeting place for urban dwellers. Modernist planning ideologies shatter scale for pedestrians with huge distances, tall buildings, rapid mobility. "The modernist rejection of street and the traditional city in the 1920s and 1930s and the introduction of functionalist ideals of hygienic, well-lit dwellings resulted in a vision of the widespread tall city between freeways" and "in the same period, architectural ideals have shifted their focus from elaborately detailed buildings erected in an urban context to spectacular individual works, often with a labored design idiom, built to be seen in a flash at a great distance," (Gehl, 56). Dockweiler Beach, the Imperial Highway, and Hyperion Water Reclamation Facility communicate that they are a destination to drive past; they are disconnected from a nuanced and organic sense of scale. To me, Hyperion lingers in the distance as a castle made for brief glances (figure 20). To many, Hyperion is not even made to be perceived.

fig. 20. Scattergood facility in the distance, the dunes framing the walkway to Hyperion from: Stone, Billy. 4th November 2021, Author's personal collection

To Gehl, modernism has created cities with "limited space, obstacles, noise, pollution, risk of accident and generally disgraceful conditions" (Gehl, 3). Due to modernism and the direction with which we have taken cities, "the traditional function of city space as a meeting place and social forum for city dwellers has been reduced, threatened or phased out" (Gehl, 3). This distaste for "modernism" predates Jan Gehl. In Jane Jacobs' genre-defining work, the *Death and Life of Great American Cities*, she decries an orthodox planning ideology of modernism. By linking it to the history of the company town, the English Garden City, and the Decentrists, she calls their utopianism a "silly substance." (Jacobs, 29). Throughout *Death and Life* Jacobs refers to a "modernization", presumably a planning ideology which *seems* contemporary, which to the average city dweller would include cleaner, quieter living, usually with indoor plumbing. Jacobs

never explicitly defines modernism but uses it in reference to the Le Corbusier-esque design plans for the city and frequents the concept as the object of her criticism. She claims orthodox modern planning ideologies say how cities "ought" to work rather than examining how they do work, what makes them work, and what makes them enjoyable.

Gehl makes the same claim, arguing that a modern city that is not walkable and bikeable not only ignores what makes cities enjoyable, but creates a health hazard. It must extend "a whole-hearted invitation to walk and bike as a natural and integrated element of daily routines (as a) a nonnegotiable part of a unified health policy" (Gehl, 7). Gehl reproposes a certain kind of mobility as health. It is worth noting that Gehl fails to propose a universal definition of mobility, and prioritizing bikeability and walkability excludes other necessary means of transportation. In discussing Environmental Justice, we often gloss over the assumption that we want healthy environments to avoid becoming damaged. On its head, this assumption appears salient, but a nuanced approach to disability encourages us to consider what this means for the already "damaged" body. By aligning rhetorics of damaged nature or unhealthy modern planning ideologies with people with disabilities, we stigmatize people with disabilities (Ray & Alaimo, 58, Johnson, 84). It is no wonder that environmental impact reports do not usually consider the environmental impact on communities with disabilities themselves. Though disability and illness are often related, we must consider how people with disabilities identify with their condition. The subjectivity of the bodies in question must be considered before we use health to prop up our arguments against car friendly cities (Ray & Alaimo, 59). In *Risking Bodies in the Wild: The "Corporeal Unconscious" of American Adventure Culture*, Sarah Jaquette Ray addresses Edward Abbey's *Desert Solitaire: A Season in the Wilderness* (1968), where Abbey notoriously compares cars to wheelchairs to support his argument of an experience of wilderness separate

from technology, or certain types of technology. While I believe that Gehl's critique of car transit is more nuanced, it must be noted part of Gehl's argument for urban mobility is a healthiness which assumes the desire to exercise in order to avoid becoming disabled. Nonetheless, Gehl's argument does probe at a misalignment between modern planning ideals and a lively city. Expanding to improve multiple mobilities only improves Gehl's argument.

Before modernist planning intervention and "the car invasion", Gehl explains that the city used to be a meeting place. People are cities' biggest attraction (Gehl, 25). Modernist planning ideology has taken away these city functions, aiming to create a "rational and streamlined setting for necessary activities" (Gehl, 26). We must ask ourselves how, along with car transit, sewage then became necessary under the modern state. We must ask ourselves how sewers and wastewater treatment followed as necessary architecture. This architecture would be a no-frills example of a building suited to just its function.

The intrinsic functionalism of sewage infrastructure I believe to be subverted in the physical experience of it, in the perception of it. If one pokes their nose through the Hyperion fence by the aerobic tanks, they can get a whiff of a very light sewage odor. The smell of gasoline from the road nearly overpowers it. In this moment one can imagine the sensorial experience of an old Hyperion, screenings dumped into the dunes, sludge pooling onto the coastline. But Hyperion endeavors to achieve something different, to make one forget about its history and instead behold Hyperion as a modern fixture, something unchangeable and unchanging; it funnels away it's histories and smells (figure 21). To the pedestrian, the smell of Hyperion categorizes it firmly as a non-place. To maintain its modernity, Hyperion requires itself to be a non-place.

fig. 21. A large pipe funnels "foul air" near the entrance to Hyperion plant from: Stone, Billy. 4th November 2021, Author's personal collection

Just up across the Imperial Highway sits the LAX Dune Restoration project. These glimpses through the fence illustrate the largest remaining coastal dune community in Southern California. Native and invasive plants populate the dune-sides. Bright blue chain link prevents cars or pedestrians from intruding on the habitat restoration. To take the pictures below in figures 22 and 23, I stuck my lens through the fence.

Left, **fig. 22.** Native and invasive plants pop through old concrete roads in the LAX Dune Restoration Area from: Stone, Billy. 4th November 2021, Author's personal collection

Right, **fig. 23.** A more serene pocket of the LAX Dune Restoration Area as seen through the fence from: Stone, Billy. 4th November 2021, Author's personal collection

Before Southern California was colonized, the coastal dune community continued for miles up and down the coast. However, as early as 1890, oil and gas production lined the coast (Kohlsted, 2018, Stanton, 1998). Industry began to break up the coast dune communities. As oil production has been phased down by 90% since its peak, most of these derricks have been deconstructed or abandoned. Eventually the coast dunes populated by oil derricks became broken up by asphalt and ocean cafes. Each small ravine between dunes created a small refuge from which to behold the ocean, cradling a body in soft sand and lush vegetation. Examining the dunes, one can imagine a utopian Hyperion. A Hyperion absent of wastewater treatment, where we all turn towards individual compost toilets and community compost centers. This Hyperion would integrate itself into the dunes and invite every passerby to sit and contemplate its monument to sewage modernism. This Hyperion would unite its past and its future and stimulate the passerby as any piece of art should, integrating an individual's sense of "lived" space, where perceived space and conceived space intersect.

The first step to this utopia is to consider Hyperion within the boundaries of this triad. By examining the representational space of Hyperion, I aim to rectify modernist planning ideologies. I aim to examine how space works, what makes space work, and what makes space enjoyable. To many, Dockweiler beach is a place, but Hyperion is not a part of it. For me it is a prospect to admire from the beach. To others, Hyperion is their workplace, and by extension a place where they devote their lives.

Brightwater Case Study - Placemaking alternatives

I'm not the first to consider placemaking at wastewater treatment facilities. Brightwater Wastewater Treatment Facility in King County, Washington incorporates placemaking to popularize its design and increase acceptance of its function. According to watertechnology.net, adequate wastewater treatment has been widely seen as one of the key factors in regional sustainable economic development. In consequence the Puget Sound Regional Council prioritized the Brightwater project, placing it on top of the list of priority projects in 2004 ("Brightwater WWTP Project, US"). In the summer of 2000, King County began looking for sites and outfall zones ("Brightwater treatment system - King County"). After a few rounds of environmental review and evaluation, King County decided on locating Brightwater along Route 9 - 195th St at an old automobile junkyard in 2003, reaffirming later in 2005 after more environmental impact statements. The treatment plant began its operations in September 2011. Including the newly constructed outfall, the treatment system cost King County, Washington $1.86 billion ("Brightwater treatment system - King County").

The treatment process at Brightwater has many similarities to that currently employed at Hyperion. At Brightwater, during preliminary treatment, wastewater travels to an influent pump

station with perforated plate screens for large object removal as well as grit separation and removal. Trash and grit are trucked to a landfill. For primary treatment, the effluent travels to aeration tanks through fine screening and then to tanks which pump the water through membrane filters so fine only water molecules can pass. This water is disinfected with a small amount of bleach and ready for reuse on golf courses, soccer fields and farms for irrigation. The solids collected in these processes head to a blend tank, a gravity belt thickener, and the anaerobic digesters. In these anaerobic digesters, like the large digesters at Hyperion, bacteria and heat help digest organic waste. Then the solids head to centrifuge dewatering before they are trucked off for land application. The methane gas created by anaerobic digestion is sent to a boiler where it is used to warm buildings and run the high energy processes at the plant. The plant takes special care of preventing odors with "control equipment" ensuring no odors travel beyond the treatment plant fence line.

The technology used by Brightwater distinguishes itself from Hyperion. Instead of the activated sludge method used at Hyperion, Brightwater uses membrane bioreactor technology. This expensive process provides substantially better final effluent quality than conventional secondary treatment ("Brightwater WWTP Project, US"). The membrane bioreactor technology also can easily be expanded to handle larger flow by adding more cartridge filters. Initially the membrane filters will handle around 20,000 m^3 per day of class A treated effluent. To expand capacity, the plant only needs to add additional cartridge filters, which theoretically could progress treatment up to 643,520 m^3 per day (Membrane Bioreactors for Wastewater Treatment, 2016).

In comparison, Hyperion has a max capacity of 450 million gallons per day on dry days and about 800 million gallons per day on wet days. Unlike Brightwater, Hyperion must also

account for dry days and wet days due to the occasional heavy rains in Southern California. Despite Los Angeles's separate stormwater runoff systems and sewage treatment systems, stormwater leaks into sewage hole covers and sewage pipes through cracks, resulting in especially high effluent flow during wet periods ("Hyperion Water Reclamation Plant", 2021). On average the Hyperion plant handles about 275 million gallons per day. In comparison, Brightwater can only treat about 36 million gallons of wastewater today and aims to treat at maximum only about 50 million gallons of wastewater within the next 20 years. Beyond flow, the plants also differ in square acreage. On Brightwater's 114-acre campus, only just over 40 of those acres are dedicated to the treatment plant, while the rest of the campus is devoted to hiking and recreation. The Hyperion campus sits at about 186 acres according to an area calculation on ArcGIS online, and nearly all this area is used for the plant itself. Like Hyperion, Brightwater also features an onsite environmental education and community center included in this aerial footprint (Winters, 2009).

The communication materials for Brightwater listed on the county website are clear, succinct, and visually consistent. As shown in figure 24, this diagram on the Brightwater website succinctly illustrates the treatment process taking place at Brightwater.

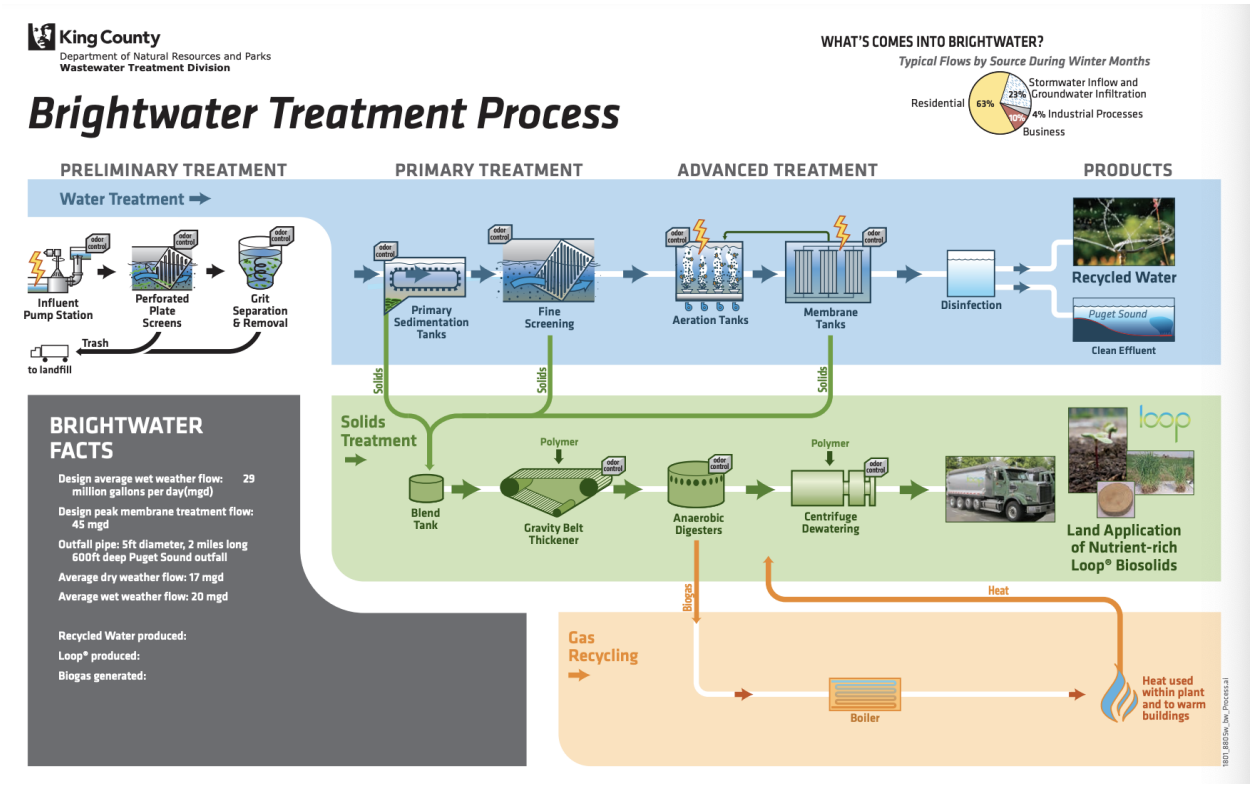


Fig 24. "Brightwater Treatment Process Diagram." King County, 2018. https://kingcounty.gov/~/media/depts/dnrp/wtd/system/Process/1801_brightwater-treatment-process.ashx?la=en

A community talk led by Kristin Covey, Brightwater Water Quality Education Specialist, is easily accessible on Vimeo and delivers a compelling narrative as to the importance of Brightwater and the success of the Brightwater Treatment Plan (Covey, 2016). The Environmental Impact Report for Brightwater illustrates three public separate seminars taking place in mid-2003 to educate and engage the public on the plant's initial Environmental Impact Statement. The first of these seminars employed various geologists, engineers, and marine biologists to explain the geological impact of the marine outfall to be constructed at Brightwater (Final Environmental Impact Statement, 6). The second looked at the plant layout and design and the third looked at the scientific and engineering studies behind the processes at the plant (Final Environmental Impact Statement, 9). The planning and layout seminar discussed the site characteristics, topography of the site, and the plans to screen the plant from public sight and

smell. Throughout Brightwater's construction, implementation, and management, King County and the Brightwater team maintain a high level of transparency to its public stakeholders.

So why does Brightwater excel in its placemaking and public engagement? As noted by Green, this level of public inclusion and high mitigation costs are largely due to the Seattle area's $4,000 to $8,000 sewer hookup fee, compared to LA's approximately $30 sewer hookup fee, (Los Angeles County, 2020, Green, 2015). Brightwater's position in a wealthy county ensured that its pollution controls would be stringent while barely affecting nearby communities. Michael Popiwny, the manager of the Brightwater Project for the King County Government, mentions in his interview with the American Society of Landscape Architect's *The Dirt*, the place had to be sold to the community to be well implemented and received: "We realized we needed this place to be beautiful" (Green, 2015).

Consequently, the landscaping at Brightwater is novel and sustainably managed. Along with restoration ecologists and conservation biologists, the key players in the landscape design of the plant were engineers with CHM2Hill, landscape architects with Hargreaves Associates and Mithun (Green, 2015). The plant includes 70 acres of public open space which highlight key sustainable practices. Coal fly ash is used in concrete instead of cement, drastically reducing site carbon emissions. During construction, excavated soils were retained and reused onsite. In the northern 40 acres of the plant, the team constructed an elaborate ecosystem which cleans rainwater before redirecting it to streams for salmon use. The construction of these wetlands involved local schools: children from local schools planted over 20,000 native willows (Green, 2015). Mithun architects' three priorities for the project were a "unified design language: a simple, clear, and consistent aesthetic using concrete panels, clear glass, and exposed steel," "inspirational experience," and "protecting health and environment" ("Brightwater Wastewater

Treatment Plant", 2011). Hargreaves Associates mentions the project in its book *Unearthed*, which demonstrates that Brightwater has been a successful interface between landscape architecture and engineering. Further, Hargreaves Associates mentions in their website how the site is both an educational facility and a major work of infrastructure (M'Closkey, 2013). The aerial plan taken from the Hargreaves Jones website below in figure 26 illustrates the scale of these reconstructed ecosystems, taking up most of the plant's 114-acre footprint.

Fig 25. Hargreaves Jones arial Brightwater plan from: Hargreaves Jones, accessed November 20th 2021. http://www.hargreaves.com/work/brightwater-wastewater-treatment-facility/

The reconstructed hills around the plant offer prospect and refuge to hikers and onlookers, engaging with a complex design language to cleverly incorporate the goals of habitat restoration and water treatment. Dense foliage and forest are used to treat runoff ("Brightwater WWTP Project, US") as well as hide the plant from view ("Brightwater WWTP Project, US", Final Environmental Impact Statement, 9). Along with the LEED certified Brightwater Education and Community Center, the grounds surrounding the plant have induced such a sense

of place that over two dozen couples have held weddings at the facility (Weiser, 2018, Klettke, 2014).

This sense of place comes from an active effort to engage the King County community in the plant's construction. As a part of Washington State's "1 Percent for Art" plan, the Brightwater facility plan contained an art plan in which artists "were challenged to create works that ingeniously expose the working processes of the system and engage the public in inquiry and discovery" ("King County's Public Art"). The public art showcases itself throughout the grounds surrounding the plant and features works from prominent artists such as Jane Song and Buster Simpson ("King County's Public Art", Simpson, 2011). Buster Simpson's piece, *Bio Boulevard*, reconstructs a large water molecule which waters some hydroponic plants along the molecule, takes expressed effluent from the plant and offers it to the wetlands surrounding the facility, recharging the groundwater. The array of art surrounding the plant purportedly helps the plant team feel more connected to the importance of their work as well as gives the public a reason to come and see the plant (Green, 2015).

Looking at Brightwater from a bird's eye view (Figure 28) gives some perspective on how the plant and its grounds situate themselves in King County. To get to Brightwater, King County residents drive. Some residences line the western side of the plant, but they are separated from the plant grounds by their own dense foliage as well as Route 9. To Jan Gehl's dismay, the only cafe sitting near the plant is Gotta Go Espresso, a drive-through coffee hut. The plant then clearly marks itself as a place but does not integrate itself in a city for people. Brightwater is another victim in planning of car-centric planning.

Fig 26. Google Maps, *Brightwater Wastewater Treatment Facility and grounds*, 4th November 2021

Hyperion Wastewater Treatment Plant has a lot to learn from the Brightwater facility, with some key differences: capacity and scale. Yet, since its inception, Hyperion has prioritized its function over a sense of a placemaking it could give to its community. Brightwater demonstrates that a wasterwater reclamation facility can do more than its initial function. The institutional history of Hyperion challenges the designers of the space to accommodate even more interests and conceptions of space than those that were managed at Brightwater.

However, neither facility begins to really question why we sewage. To truly placemake, and reverse the trends of supermodernity, we have to link our perceptions and conceptions of space. Part of this is engaging critically with the histories and narratives we tell ourselves when we enter space. Facilities which work under the state aim to contribute to processes under the state, not disrupt or radically change them. Infrastructures like Hyperion build upon previous infrastructure and communicate to its users that they exist in a modern society. Sensory experience at infrastructure sites communicates the same modernity, and obscures deep sensorial histories. It is my hope that we can begin to imagine an infrastructure which works towards creating a sense of place that engages histories and sensations. To do so we must reimagine effluent.

Conclusion

My first impression of Hyperion Water Reclamation Plant was as a monument. Driving by at night with its pipes, lights and domes unfolding vistas in front of me. But Hyperion contains multitudes in its sights, smells, and textures. It is both a monument and a monster. It's retro futuristic siding and pipes have provided the backdrop for sinister science fiction movies such as Soylent Green and Planet of the Apes. This aesthetic transcends the purely physical; it's a monstrosity of a monument also for the histories it contains. For my thesis I wanted to conduct a site analysis. By examining how our sights, smells, feelings of Hyperion might interact with our historical understanding of Hyperion, we can begin to understand how Hyperion delivers to us our current experience of the plant.

Cultural attitudes towards sewage have solidified in the last century. We now call it waste. Simultaneously as our droughts worsen, we pump billions into developing new

mechanisms for filtering our precious waters from our waste. In response to the epidemics and pandemics of the 19th and 20th centuries, when we started moving our sewage out of sight based on theories of miasma, we deprived our soil of the precious nutrients our sewage contains. We have also deprived our water tables of the water in our waste which would normally percolate and filter through the soil. Also, when we combine all our fecal material in a largescale sewage system, we combine pathogens and pollutants contained in the runoff that seeps into that system. We create a dangerous unknown mixture which will only become more precarious as we subject it to anaerobic conditions, eventually producing more dangerous chemicals and chemical combinations such as hydrogen sulfide and sulfuric acid. We've somehow progressed from pits where we'd leave our poop and sophisticated mechanisms for reclaiming human waste to reuse in agriculture, to a massively convoluted series of pipes and filters. Hyperion contains this history; it has become of it.

To understand the space of Hyperion I borrowed the framework from urban planner Janna Carp which she has borrowed from Henri Lefebvre, using it for more of an architectural/aesthetic site analysis. Lefebvre aimed to understand social space through a conceptual triad, suggesting that social space consists of moments of the triad, which at times overlap. For the first moment of the triad and first section of my paper, perception, or how we see, hear, smell, taste, and touch a space, I chose to examine some theories of perception in architecture and infrastructure. This includes how our perceptions of human waste have led us to both calling and making that waste dangerous. Importantly, the plant itself is dangerous. The pressure in the pipes could kill an individual on impact. The effluent at various stages of the treatment process could make an individual gravely ill. Becoming dangerous has been a crucial aspect of becoming modern. Wastewater infrastructure is seen as an integral part of the

"modern" city. In this way Hyperion tells us that Los Angeles's wastewater treatment is modern. Aesthetically, the plant also communicates this modernity: functionalist steel pipes, concrete, its massive scale. These modern aesthetic signals also make human waste dangerous. The scale of sewage makes it hazardous. Precarity at this scale creates a nuisance which must be controlled by something greater than an individual, a governmental apparatus. The promise to care for precarity at this scale lends itself to the monopoly on violence, characteristic of the modern state.

For the second moment, conception, I chose to recount the institutional history of Hyperion. With this I could capture the material of Hyperion within its conceptions. For the third moment, representational space, I've done a sort of ground truthing analysis of Hyperion. Ironically, this section adopts the framework established by Jan Gehl in *Cities for People* to examine a site which technically serves people and their wastes but also is distinctly not for people.

With these moments of the triad, I have begun to ask how an institution like Hyperion operates on us aesthetically, separated from its function, and I've begun to ask how we relate this affect to our histories of sewage. How can we approach an infrastructure and understand an infrastructure as the culmination of years of dialectical institutional history?

This thesis has not reached a concrete answer. Something about the plant is beautiful and something about the plant is foreboding, and as we look toward a future of climate action and hazardous waste, something about this plant needs to change. Though I think the change we need is the abolition of large-scale sewage systems and dangerous concentrations of sludge, I believe if we first open these public infrastructures to conservations based on our lived experience of them, we can reach a public critical consciousness which might allow us to move towards better infrastructures.

As we achieve this critical consciousness, we can begin to reimagine the urban form. Engaging with Hyperion's catastrophes requires more than just filtering its air. To invoke Adrienne Maree Brown, it requires a sort of emergent strategy, or small interventions that can be scaled up for larger actionable sollutions. For that I'd look towards the work of Cesar Añorve's Centro de Innovación en Tecnología Alternativa in ecological sanitation, discovering and implementing new small-scale toilets which return the nutrients in our waste to the soil. These toilets such as the double vault dehydrating toilet, make it possible for communities take their sanitation into their own hands, in a manner sensitive to the ecosystems they inhabit.

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