DUTCH SCAPES
Dutchescape: Analyzing Landscape Infrastructure in Amsterdam, The Netherlands

by

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With Honors

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This book would not exist without the support of:

My family and friends for allowing me to have this unforgettable experience. I especially thank my parents and grandparents for their support the past five years of university.

Madeline Bergeron for her encouragement and support this past semester.

Richard Hawks, my advisor, for his guidance and encouragement.

Zachary Barker, April 2013
Dutchscape
Analyzing Landscape Infrastructure in Amsterdam, Netherlands
This project examines the potential of landscape infrastructure integration of transport infrastructure into public space in Amsterdam, The Netherlands, via supporting case studies. The case studies include a hybrid office space at Tussen de Bogen, a green corridor at Churchill-laan, and an innovative stormwater management landscape at Rietlandpark station. Case studies are comprehensively described with diagrams and supportive images for repositioning infrastructure as a viable medium for addressing issues of transit, urbanism, and ecology. A fourth site at Sloterdijk Station will showcase a conceptual design based on landscape infrastructure principles.
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The following terms are defined by the author or come from lexicon of garden and landscape architecture.
Landscape Urbanism
A landscape architecture theory that emphasizes landscape as the dominant form generator to urbanism.

Context
Associated with coherence and the activity of weaving. It can signify a set of immediate general conditions that help situate meaning.

Corridor
A belt of land between two other areas, typically having a particular feature or giving access to a particular area.

Edge
The line where an area begins or ends.

Infrastructure
Subordinate parts that form the basis of a system, or organization or an enterprise. A large physical structure which has the purpose of conveying resources, transporting goods or people, or performing a large-scale purpose.

Typology
The systematic classification of types that have characteristics or traits in common.
introduction

Focus
This project focuses on the integration of transport infrastructure into public space because both are inseparable from the practice of landscape architecture.

Framework
Three landscape architecture theories provide the framework for this study: landscape infrastructure, landscape urbanism, and logistics landscape theory. These theories are all interrelated and are occasionally generalized with the landscape urbanism title. All three theories emphasize flexible methods of representation, including process diagrams and phasing of implementation.

Landscape urbanism is an emerging theory in landscape architecture lead by Charles Waldheim and James Corner. Landscape Urbanism argues that landscape, rather than architecture, should organize a city and enhance the urban experience. It also seeks to reintroduce critical connections with natural and hidden systems and proposes the use of such systems as a flexible approach to the current concerns and problems of the urban condition.

Landscape urbanism is a controversial topic and is often considered a critique of New Urbanism and other more established urban design methods.

Logistics Landscape theory, led by Alan Berger, claims that new landscapes based on global economics are replacing infrastructure created post World War II. Logistics landscapes are characterized by optimization and large networks of communications. Three emergent categories of logistics landscape exist: distribution and delivery, consumption and convenience, and accommodation and disposal.

Landscape infrastructure is a theory that suggests that, “once married with architecture, mobility, and landscape, infrastructure can more meaningfully integrate territories, reduce marginalization and segregation, and stimulate new forms of interaction. It can then truly become ‘landscape.’” This stems from the increasingly relevant landscape urbanism theory that landscape has replaced architecture as the main medium for urbanization.
Infrastructure systems no longer exclusively belong to engineers and transportation planners. In the context of rapidly changing cities and towns, infrastructure is experiencing a paradigm shift where multiple-use programming and resiliency are primary considerations. Defining contemporary infrastructure requires a multi-disciplinary team of landscape architects, engineers, architects, and planners to fully realize the benefits to our cultural and natural systems.

**What is Infrastructure?**
Infrastructure commonly refers to, “the basic facilities, services, and installations needed for the functioning of a community or society, such as transportation and communication systems, water and power lines, and public institutions including schools, post offices, and prisons.” Highways, rail, harbors, airports, power lines, canals, dams, and landfills are the support systems that make urbanization possible. The sheer scale of these elements renders their understanding as a single system practically impossible, yet their operations depend precisely on their ability to support the flows of capital and cultural mobility.

Existing infrastructural systems have several defining characteristics.

First, the system is usually hidden from view. Often found underground, or beyond the periphery of cities, the presence of urban infrastructure remains largely unnoticed until the precise moment at which it fails or breaks down. Floods, blackouts and structure collapses serve as a few reminders of the limited capacity and fragility of this large operating structure. Think of Syracuse’s aging storm water system and the problems the city faces with combined sewer overflows.

Second, the United States as a society has traditionally placed a high value on the design of monofunctional infrastructure systems, engineered to provide a consistent level of efficiency throughout their lifespans. Such a singular approach produces serious impact on the way infrastructure contributes to urban life. Parking lots, transportation corridors, transit hubs, and channelized waterways are left idle between peak hours, creating...
voids and barriers in the city. For example, the U.S. Interstate Highway system was initially developed for national defense purposes, but over the last fifty years the highway network has been repurposed for civilian use. Due to overcapacity and lack of funding for improvements and maintenance, the infrastructure is in disrepair. The state of the I-81 corridor in Syracuse, New York is just one example among thousands of issues along the 46,876 mile infrastructural network.

Last, the design and construction of infrastructure was historically conceived independently, often in contrast to the overall urban plan. For example, entire neighborhoods, such as Syracuse’s 15th ward, were razed to accommodate a new interstate highway system. The plan was to remove an unsightly part of the city, but little research was done on how the overpass would affect surrounding areas. The result was a massive loss of the city’s tax base as citizens flocked to the suburbs, and a city essentially divided in half.

The integration of the infrastructural system within the landscape framework requires a redefinition of the old system within a new set of paradigms that are more flexible, contingent, and multidimensional.

First, the nature of infrastructure today is successional, where modes of infrastructure may quickly become obsolete, redistributed, and reinvented, subjected by global geopolitical and economic forces. Industry is making the transition from a nationally decentralized organization to an internationally distributed one and is producing a new landscape in the process, a landscape of logistics. Vast distribution centers are replacing the factories and warehouses of the industrial revolution. This focus on distribution in the United States, as opposed to production, has created a new focus on large-scale transit infrastructure. The contingency of today’s infrastructure necessitates that the system be designed for flexibility and adaptability. This is a drastic departure from American infrastructure projects in the 50 and 60s that were engineered to serve a single function.

Second, traditional infrastructure was conceived as a centralized, single purpose system while the trend for today’s infrastructure system is to become decentralized, where needs, such
as stormwater runoff, are resolved at a local level. For example, in Maryland the stormwater management act of 2007 requires the use of nonstructural best management practices and other better site design techniques be implemented to the maximum extent practicable in order to protect the waters of the State from adverse impacts of urban stormwater runoff. This is a dramatic departure from the traditional approach of treating stormwater in a single centralized treatment plant. The result is a more resilient stormwater system and cleaner water in the Chesapeake Bay.

Last, infrastructure such as rail corridors, “are required to perform multiple functions: they must fulfill the requirements of public space and must be connected to other functioning urban systems of public transit, pedestrian movement, and water management, economic development, public facilities, and ecological systems.” Multi-functional infrastructure conserves land, shares the financial load of its development, restores damaged natural ecologies, reinforces healthy transit options, and provides public access to vital open space. The multifunctional potential of infrastructure also speaks to the cultural and ecological importance of diversification, leading to an ideal condition where the city and its infrastructure are one and the same.

**Why Study Amsterdam?**

There are few places in the world where infrastructure is more vital to human existence than in The Netherlands. The country sits at the northwest corner of the great European plain, and almost two-thirds of the Netherlands is at or below sea level. Taming water along rivers and the North Sea allowed the Dutch to methodically reclaim more and more land. Interior lowlands were originally reclaimed for farming and later for settlement. Dikes, levees, dams and other infrastructure have become fundamental parts of the Dutch landscape.

Today, the Dutch are still faced with the many dangers of occupying reclaimed land in a delta landscape. Major infrastructure projects such as the creation of new barrier islands are nearly continuously being constructed to combat the sea. In Amsterdam, land is subsiding around one inch every three to five years. Subsidence poses drastic environmental and economic costs including...
increased flood risk, salinization of ground water, and damage to natural sea barriers. Sea-level rise resulting from climate change further amplifies the issues the Dutch face. As a result, the Dutch have adapted and are now widely considered the world’s leading experts on water management and transportation infrastructure. 

Space is the biggest luxury in The Netherlands. Not only is most of the land in provinces of North and South Holland manmade, but The Netherlands is also one of the most densely populated countries in the world. With a estimated population of over 16.5 million and a density of 375 persons per square kilometer the Dutch have little space to work with. They have become masters at reusing space for numerous purposes and at putting disparate things next to each other. Wonerfs are one example of multiple use infrastructure found in the Netherlands. They are residential streets designed as public spaces for socializing and play. Wonerfs are unusual because they are purposely designed to serve the needs of both vehicles and pedestrians.

Amsterdam, as the urban center of the Netherlands, is the ideal location to study landscape infrastructure. The city offers several different types of transit corridor typologies including elevated train tracks, underground metro, at grade trams, multimodal streets, and urban highways. With Centraal Station located in the center of Amsterdam, infrastructure has carved massive corridors through city. The corridors vary in typology, but each has had a drastic impact on its surroundings. The corridors were developed for the transport of both people and goods. Amsterdam and nearby Rotterdam are two of the largest ports in Europe and serve as gateways to the continent.


The following sources have been summarized in an attempt to gain background knowledge before the main study is conducted. The topics vary widely with many focusing on emerging theories in landscape architecture to help provide a framework for the proposed study. In general, broader sources were chosen because they provide a conceptual framework that can be explored and tested during the off campus semester.


The moving people chapter of The Works deals with how subways function in major cities across the planet. Primarily focusing on New York City, the chapter discusses how the modern system came into existence. Originally subway lines were developed as private companies until they became publically operated when the private companies faced bankruptcy. The chapter also discusses how subway stations are designed and how they function. The rest of the chapter deals with the infrastructure that supports the operation of the subway system including the rail yards, support cars, and signal towers.


This source comes from a book that deals with design and its role in Dutch culture. The essay talks about how the trains have been designed to have a sense of clarity and modernism. There is a fear that the Dutch rail companies are losing there sense of “Dutchness” when they hire outside advertising agencies.

The moving Freight Chapter of The Works deals with the infrastructure involved with railroads in metropolitan regions. In the United States the shipment of goods by rail has drastically reduced do to the use long distance trucking on the interstate highway network. The federal government had to intervene the late 70s to reinvest in railroad infrastructure in the northeastern part of the country. The rest of the chapter deals with the differences in railcars, classification yards, and transcontinental freight.
This essay in Berger’s larger work Drosscape deals with both infrastructure of the industrial revolution and modern infrastructure. Landscapes of the industrial revolution were focused on production and had little concern with the environment. Global economics has shifted production farther and farther away and as a result society has become more mobile and needed more infrastructure. Berger uses the word dross to describe the wasted space that is created as a result of infrastructure. In regards to infrastructure corridors, he mentions the inefficient use of buffers and medians and how they need to serve a larger ecological role.

In Terra Fluxus, Corner is suggesting that landscape is becoming the dominate model for urbanism. Landscape drives the process of city formation. Corner explains, that the most significant of these traditional urban landscapes possess the capacity to function as important ecological vessels and pathways. He mentions four themes for landscape urbanism theory. The first is, the promise of landscape urbanism is the development of space-time ecology that treats all forces and agents working in the urban field and considers them as continuous networks of inter-relationships. The second theme of the landscape urbanism project concerns itself with surface, more specifically urban infrastructure. Third, is an operational or working method. The fourth theme is the emphasis on the imaginary and not over simplification. Corner concludes in saying that the failure of earlier urban design and regionally scaled enterprises was the oversimplification, the reduction, of the phenomenal richness of physical life.

Gueze describes the design and construction of Carrasco Square in Amsterdam Netherlands. Carrasco Square is a public space that lies under elevated rail lines. West 8 transformed the derelict space into a place for commuters to park their cars and also allow commuters to take a shortcut to the various office buildings in the area.


FLUXscape is a new innovative plan for remediating derelict infrastructure corridors in Philadelphia. Three sites are used to explain how flexible design strategies can spur development and reinvestment in the city. Each site is a different typology of rail lines. The first site, Amtrak Northeast Corridor is an active rail line that will incorporate high-speed rail and phytoremediation. The second site, Reading Viaduct Corridor is a proposed elevated park, similar in typology to the Highline, except that is elevated with earthen berms instead of steal infrastructure. The third site is the Port Richmond rail yards which is being re-envisioned as a rails with trails corridor. These case studies are relevant because they deal with rail infrastructure and how it can serve more than just one role for a city.


This article is a summary of an interview between Nam Henderson and Gerdo Aquino, the president and Principal of SWA Los Angeles studio. Gerdo teaches a studio at USC on landscape infrastructure in an attempt to think about the best ways to maximize various infrastructural corridors. The studio specifically looks at how these contiguous corridors have changed uses over time and have adapted to a contemporary society that is looking for ways to do new things. These projects are centered right at the intersection between urbanism, parks, and infrastructure. Gerdo is most
concerned about process, particularly design evolving out of a community conversation.


This essay deals with the architectural idea of context. Context is both a general and specialized disciplinary term. The basis for the term’s disciplinary specialization is not its specificity, but its flexibility. The question of context is similar to that of style. They both are an attitude about history and describe a legitimate foundation for change as well as a force running counter either to progress or authenticity.


Lyster is writing about how economics has shaped the landscape. She calls modern business models of transporting goods the “just in time” method because more businesses are streamlining their production methods and the way they move goods globally. Contemporary exchange networks instead have the tendency to procure a more phased articulation across territory to accommodate the multiple intersections that are now indispensable to their operational success. Also, she mentions that efficiency and optimization of exchanging of goods has become more important than ever in the shaping of the world’s commercial and industrial sites.


Landscapes of Infrastructure essay suggests that the landscapes of infrastructure have become the most effective means to explore the relationship between natural processes and the city. There is a focus on ‘the landscapes of movement’ and how they must fulfill multiple functions: they must fulfill the requirements of public space and must be connected to other functioning urban systems of public transit, pedestrian movement, economic development, public
facilities, and ecological systems. A key finding from Mossop’s essay is that at lower traffic densities, it becomes possible to design roads as spaces to be shared by people and vehicles.


Jolles describes the history of infrastructure in Amsterdam. Much of Amsterdam’s transportation infrastructure has resulted from long planning processes. The main concern for the city has been trying to strike a balance between accessibility and livability.


This article is about Baltimore’s experiment with using sedums to replace hardscape along the light rail track. Green tracks are more common in Europe, especially in Germany. Sedum species have been found more successful, compared to turf grass, and have even been found to lower the ambient heat in the surrounding area. This article is useful because it is a real world example of what has been suggested in other literature on landscape urbanist thinking about infrastructure.


As a result of global economics ever growing dispersal of production, contemporary society has become heavily dependent on mobility for its economic life. Transportation lines and multi-modal interchanges make mobility so visible. Urbanization has always developed around traffic nodes. During the industrial revolution railroad stations served the main traffic nodes. Modern cities are growing around highway exits, airports, and fast-moving trains. Transport lines help to intensify land use. The concern for compensating for the cost of infrastructure by either profiting from real estate development or augmenting the number of passengers remains a major incentive for integrating transport planning with urban development.

This article deals with the construction of a bridge in Italy. It discusses the idea of creating forms in infrastructure that serve more than a purely utilitarian approach to engineering. The argument was that when infrastructure is done currently it can be come an icon for the city and region and spur future development. Although it may not be serving any ecological roles the infrastructure is still multifaceted because it goes beyond the standard design.


Stilgoe summarizes the history of the role landscape architects played in railroad station design in United States. Landscape architect’s, such as Fredrick Law Olmstead, created detailed gardens around small town train stations in an attempt to market the town to potential homeowners. Ultimately the movement died out as a result of landscape architects seeking out government and domestic clients rather than corporate industrial ones.


Strang argues that infrastructure systems are an essential visual component of urban environments because of their scale and inability to be hidden. He also mentions that there is a tendency to engineer infrastructure for only one purpose. He compares this type of thinking to cloning in horticulture. Mumford’s main point is that both infrastructure and nature are resilient and adaptable, but also unpredictable and uncontrollable. He concludes by saying that we must find ways to allow the natural landscape and the landscape of infrastructure, which occupy the same space, to coexist and perform multiple functions.

Waldheim and Berger suggest that industry is transitioning from a nationally decentralized organization to an internationally distributed one and is creating a new landscape in the process, a landscape of logistics. This paper describes three emergent categories of logistics landscapes: distribution and delivery, consumption and convenience, and accommodation and disposal.

Common Themes

Several common themes were apparent in the literature reviewed. A global economic shift to a just in time production method, resulting in dramatically new landscape infrastructure was the most common theme. Also the need for multifaceted infrastructure corridors was another standout message from the readings. These themes can then be summarized in a larger context by saying the message is that infrastructure is fundamentally changing and there is a pressing need to do it in an ecologically responsible way that not only improves the health of the planet but also makes vibrant urban environments.
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context
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A brief timeline on the history of transport infrastructure in Amsterdam.¹
In 2001, Amsterdam Airport Schiphol became the first airport in the world where passengers can pass passport control by means of iris recognition. It is the 4th busiest European airport in terms of passengers a year, with 1.5 million tons of cargo per year. Amsterdam Airport Schiphol handled 204 million passengers in 2022, 400 million passengers per year for Gemeentelijk Vervoerbedrijf, and 50 million passengers per year for Nederlandse Spoorwegen.

The following infographic compares current statistics of the three major transport infrastructure companies in Amsterdam. The infographic presents data on passenger residency, male/female passengers, reason for traveling, transportation network, number of routes, tram fleet, punctuality, and getting to train station.
In 2001, Amsterdam Airport Schiphol became the first airport in the world where passengers can pass passport control by means of iris recognition.

4th busiest European airport in terms of passengers a year

1.5 million tons of cargo per year
The following images highlight the major infrastructure projects in Amsterdam to be completed in the coming decades.\textsuperscript{7,8,9}

A central bus station will be located at the same level as the train tracks. The bus station is in this way an extension of the railway station. All stops for city and intercity buses will arrive at this terminal. The terminal will accommodate twenty-four buses at once. Eighteen stations will be for articulated buses and the other six stations are intended for standard buses.

The North-South metro line is expected to open in late 2017. It will have fifteen new metro stops connecting the southern financial district and the Amsterdam-Noord with the center of the city. Although not currently planned, the line may eventually extend to Schiphol Airport.
Amsterdam Centraal Station is completely renovated

The transfer capacity of the station will be improved making the public transportation network more efficient. The renovations will include building two new passageways with shops and other amenities for visitors. There will be more room for the trams and a bike and pedestrian tunnel will be built.

ZuidasDok transport hub completed

In 2040 the railway station will become the second main station of Amsterdam. It is expected to become the 5th busiest passenger station in the Netherlands, with connections to Schiphol Airport, Rotterdam, Antwerp, Brussels, and Paris by high speed rail. Future development includes an underground line directly to Schiphol airport. The Ring-A10 will be tunneled to allow more development in the Zuidas.
Canals
Amsterdam’s canals were built in the early 17th century as part of a massive city planning project. The canals were built to transport people and goods throughout the merchant city. The canals also function as sanitation and storm water infrastructure for the city. Today the cities’ canals carry almost entirely tourist and recreational traffic. The canals are also home to some of the most expensive properties in all of the Netherlands. In 2010 the area surrounding the canals gained UNESCO world heritage status.²

Motorways
The first Dutch motorway opened in 1936, when the current A12 was opened to traffic between Voorburg and Zoetermeer. Motorway construction accelerated in the 1960s and 1970s, but slowed to a crawl in the 1980s. Since 1991, only 100 kilometers of motorway have been constructed in the entire country.³

Airport
Amsterdam’s airport, Schiphol opened on September 16, 1916 as a military airbase. It opened to commercial traffic four years later. Today it is the fourth busiest airport in Europe and is widely considered the most innovative airport in the world. In 2002 an annex of the Rijksmuseum was opened inside Schiphol.⁴

Rail
Rail transport in the Netherlands began on September 20, 1839 when the first train successfully made the 16 km trip from Amsterdam to Haarlem. After the route between Amsterdam and Haarlem was deemed viable, a route to Rotterdam was constructed.

The first railroads in the Netherlands were constructed and operated by private companies. This resulted in a concentration of railroads in the highly populated provinces. In 1860 the government intervened to expand the rail network. While the government built the majority of the railroads, the private railroad companies continued to build their own lines until 1938 when the two largest rail companies merged into Nederlandse Spoorwegen (NS). As part of the merger the government bought all remaining shares, yet never nationalized the company meaning NS is a privately owned company owned by the Dutch government.⁵


part I: case studies
site investigations
[tussen] de bogen

churchill-laan

reitlandpark station
site locations
[tussen] de bogen
Tussen de Bogen translates to “Between the Arches” in English. The translation is quite literal, as the site is located under the arches of an elevated rail corridor on the north west side of Amsterdam. As many as 250,000 people a day travel over Tussen de Bogen on their way to or from Centraal Station.

Tussen de Bogen may be classified as landscape infrastructure because it forms a hybrid of office space and infrastructure corridor. It is an example of how transit infrastructure can contribute to the densification of an urban environment instead of repelling density which is the usual scenario.

The site has become well known in Amsterdam as a collective hub for the creative class. Architects, programmers, visual artists, and musicians are just a few classifications of the people renting space at Tussen.
context
legend
1 haarlemmer houttuinen
2 office entrance
3 eastbound lane
4 bus lanes
5 westbound lane
6 underpass
7 plaza
8 playground
Haarlemmer Houttuinen, the road running adjacent to Tussen de Bogen is one of the city’s main arteries. The street’s interior lanes are designated for buses only. The bus-only lanes have remnants of tram infrastructure in the pavement. The train tracks are heavily used above Tussen de Bogen. The site is located only a few hundred meters east of Centraal Station which serves hundreds of trains a day.
The pedestrian circulation at Tussen de Bogen is pushed to the edge of the street. Both sides of Haarlemmer Houttuinen have relatively wide sidewalks but pedestrians share the space with bicyclists. There are no bicycle lanes on the street. Most people headed from the north walk south into the Jordaan before moving east or west so that they don’t have to walk along Haarlemmer Houttuinen. There are very few access points to the north of Tussen de Bogen, but they are very well defined with signage.
The majority of Tussen de Bogen is occupied by design-related companies. The space is well known as being a creative hub in Amsterdam.
Public transportation infrastructure dominates the landscape at Tussen de Bogen. The rail corridor has been built over part of the canal to maximize the amount of street width on Haarlemmer Houttuinen.
Churchill-laan

Coordinates: 52°20'49.34"N 4°53'35.62"E
Elevation: 23'
Neighborhood: Nieuw Zuid

Churchill-laan is an example of how transit infrastructure can create open space in a dense urban environment. The site is surrounded by transportation infrastructure on all sides, but still manages to be a highly utilized public space. If the tram corridors did not flank the interior public space on Churchill-laan it is likely that the space would be programmed differently with parking or an outdoor market space.

Churchill-laan is located in a primarily residential neighborhood near the southern edge of Amsterdam. Cars are more common here than either of the other study sites, but they are not given priority over other forms of transportation.
legend
1 churchill-laan eastbound
2 churchill-laan westbound
3 fountain
4 tram station
5 open lawn
6 perrenial bed
7 maasstraat
Churchill-laan is surrounded by vehicle lanes. Each circulation lane is clearly defined and separated from the adjacent modes of transportation. The bicycle lanes are painted red and separated from the sidewalk and car lanes by small curbs. The tram is separated from the car lanes by a narrow median and curb.
Pedestrians have plenty of space at Churchill-laan. The sidewalks are approximately 10’ wide and separated from the bicycle lanes by a low curb. The park space has 25’ wide promenades for strolling under a dense tree canopy. A 6” step down is used to separate pedestrian space from the tram lines.
Churchill-laan is one of the few streetscapes in Amsterdam where there is ample pervious surface. Much of Amsterdam is paved and water is directed underground or into the canals, but at Churchill-laan much of the water is allowed to infiltrate into the soil.
Churchill-laan is a wide streetscape featuring ten distinct transit corridors allowing pedestrians, bicyclists, cars, and trams, to pass through the site safely.
Rietlandpark Station

Coordinates: 52°22'23.22"N 4°56'01.49"E
Elevation: 4'
Neighborhood: Eastern Docklands

Rietlandpark Station is the newest of the three site investigation sites. Located near the harbor front on the north eastern side of the city, the site is surrounded by an eclectic mix of modern architecture and formerly industrial buildings.

The station is submerged in the landscape because Rietlandpark Station is the lost stop for tram 26 before it enters the Piet Heintunnel tunnel. The submerged station also serves as a stormwater collection basin. It is designed to hold excess water under its platforms. This proves the Rietlandpark Station is an example of landscape infrastructure because it is decentralizing stormwater management issues and serving multiple functions as a tram station and a stormwater basin.
context
legend
1 retaining wall
2 emergency exit
3 eastbound lane
4 public art
5 eastbound station tram 26
6 tram 26 tracks
7 westbound station tram 26
8 elevator
9 escalator
10 tram 10 tracks
11 tram 26 underground
12 play area
The vehicular circulation at Rietlandpark station is complex because of the multiple intersections of different transit corridors. The station is located on the tram 26 line and is submerged in the landscape as it prepares to enter the Piet Heintunnel on the way to Ijburg. Tram 10 line runs from Java Island above tram 26 line.

- tram stop
- tram line
- bike lane
- car lane
Pedestrians have several options for movement around Rietlandpark station. Elevators, escalators, and stairs allow for access into the submerged station. Approximately 20’ wide sidewalks surround the station to allow pedestrians to feel safe as they walk adjacent to the busy arterial streets surrounding the station.
The drainage system at Rietlandpark station is camouflaged. The waiting platforms are sloped away from the tracks and feature long slot drains that hold excess water underneath the two platforms. The two main staircases are each sloped to the west into slot drains that are running parallel to the stairs.
Rietlandpark Station’s pervious surfaces are found on very steep grades and, consequently there are erosion issues.
Rietlandpark Station is submerged in the landscape. This is to help serve as a stormwater management site as well as to allow tram line 26 enter the Piet Heintunnel as it travels east towards Ijburg.
part II: applications
Part two of this project attempts to document a conceptual design based on knowledge gained from analyzing landscape infrastructure at Tussen de Bogen, Churchill-laan, and Rietlandpark. The first half documents the existing conditions found at the study site. The second half documents the conceptual design and discusses how it follows the concepts of landscape infrastructure.
site location
Sloterdijk Station

Coordinates: 52°23'14.97"N  4°50'12.71"E
Elevation: 15’
Neighborhood: Teliport

The site was chosen because of its proximity to Sloterdijk station. Tram, rail, bus, and bicycle corridors surround the site, making for a highly complex landscape. The city has big plans for this area of the city, but all realized plans up until today have been considered a disappointment. Many of the surrounding office towers remain without tenants and plans for massive station expansion have been recently scaled back.

Images:
top left: view of western facade, middle left: view south from site, bottom left: drainage problem at site, right: current condition of site
context
plan

legend
1 radarweg
2 sidewalk
3 pillar
4 train tracks
5 train station
6 stairs
7 tram tracks
8 metro tracks
9 raised planter
10 station plaza
11 bus lane
12 sidewalk
13 open lawn
The vehicular circulation at Sloterdijk station is dominated by the rail infrastructure of trains, metros, and trams. The train infrastructure runs directly over the site. The metro is also on elevated track just east of the site and the tram runs at grade in between the train and the metro lines.
Pedestrian circulation is centered around Sloterdijk station. Much of the pedestrian movement is on an elevated walkway that is shared with bicyclists. The walkway separates the pedestrians from the busy bus terminal underneath.
cross section a
The ground level of the site is flat and does not allow for drainage. The grass underneath the station is not growing well due to the excess water and lack of sunlight.
conceptual design
The following pages describe a conceptual design for a site under Sloterdijk Station platforms nine and ten. The proposed contour lines are based on an educated guess and are by no means accurate.

A two-story building is proposed with ground level access on both levels. The building would be programmed as a café or bar for the station visitors. There are many office buildings nearby to keep the café busy.

The bottom level can be accessed from the east through a small entry plaza and from the northwest by a large staircase. The bottom level near the proposed building holds tables for outdoor dining. The ground level of the building would hold the kitchen and other business necessities. North of the building a small one-story building would be constructed to retain the steep slope and provide storage facilities for the outdoor furniture.

The second level has more outdoor dining as well as benches for sitting and viewing over the constructed wetland. The second level is accessed from the east by a staircase or elevator. A secondary pathway leading to the proposed dining area provides access to the northeast of the site. A wider covered walkway provides entry from the northwest.

On the western side of the site is a large constructed wetland to contain and filter the stormwater that is currently saturating the landscape surrounding the site. A drainage system will capture the runoff from the stations roof and release it into the wetland. The wetlands form is derived from the large oval planters that are located on the east of the station. A gabion wall is used to contain the wetland. A boardwalk mirrors the wetlands shape, providing a stimulating environment for travelers passing through the station. Reclined seating is provided for travelers looking to relax outside the station.

South of the entry plaza is an area designated for bike storage. There is currently a shortage of bike storage at the station. Many people park their bikes at the station overnight as they leave the city by train to return to their suburban homes.
This conceptual design is based on the paradigms of landscape infrastructure because it is flexible, decentralized, and multifunctional.

The design is flexible because it allows for future development to the west and south. These areas were not incorporated into the design because they provide greater potential for a substantial development.

The design is decentralized because it solves stormwater management issues on site instead of pushing the problem onto the larger engineered stormwater system. The water that was originally seen as an issue now becomes a major site amenity. The water will also be naturally filtered by the wetland, although occasionally the wetland would need to be managed to remove excess sediment collected over time. The site’s wetland also provides a logical link to Amsterdam’s existing green matrix. Sloterdijkermeer (former factory garden space) is located a few hundred meters to the east and Spieringhorn (natural wetland area) is located a few hundred meters to the west. Birds and other wildlife will frequent the constructed wetland as they travel between the two underdeveloped areas.

The site is now multifunctional because it operates as both a commercial space and a transit corridor. The densification of uses allows for minimal new space to be occupied, thus leaving room for larger development projects around the station. The city designated this area for high-rise development and intends to create a modern office district surround the station.
proposed plan
level one

legend
1. storage room
2. train station
3. walkway
4. retaining wall
5. stairs
6. proposed building
7. elevator
8. entry planter
9. bicycle storage
10. walkway
11. tables
12. reclined seating
13. boardwalk
14. level one plaza
15. stairs
16. engineered slope
17. gabion wall
18. boardwalk
19. constructed wetland
proposed plan
level two

legend
1 level two walkway
2 train station
3 walkway
4 retaining wall
5 stairs
6 proposed dining area
7 elevator
8 entry planter
9 bicycle storage
10 walkway
11 outdoor dining area
12 reclined seating
13 boardwalk
14 level two plaza
15 stairs
16 engineered slope
17 gabion wall
18 boardwalk
19 constructed wetland
proposed section a-a₁
A two-story building is proposed with ground level access on both levels. The building would be programmed as a café or bar for the station visitors.
proposed drainage detail

A pipe captures the rain from the roof and releases it into the constructed wetland.
The proposed building is located under several layers of infrastructure including the station roof and track. The existing columns provide support to the proposed second level.
view across entry plaza at proposed building
view of second level plaza and proposed building
view across the constructed wetland towards the proposed building under the elevated tracks
conclusion
While attending The State University of New York College of Environmental Science and Forestry in Syracuse, New York, I was exposed firsthand to the issues of poorly designed and outdated transportation infrastructure. Interstate 81, an elevated highway intended to move vehicles at high speeds through downtown Syracuse, has had overwhelmingly negative consequences on the urban fabric of the city. Most dramatically, I-81 is a physical and mental barrier dividing the city in half.

Fascinated and appalled at the effect the highway has on the city, I undertook a research project. I learned that Syracuse is but one of many North American cities faced with transportation infrastructure problems. Many post-WWII urban infrastructures, including the elevated highway through downtown Syracuse, are approaching and passing the end of their service lives and are antiquated in terms of design standards. During the next decade, portions of highways across the nation will need to be removed, replaced, upgraded, rebuilt, or otherwise altered, all at a substantial cost. This issue affects us all.

According to research produced for the landscape infrastructure symposium at Harvard in the spring of 2012, nearly all of our infrastructure will become obsolete in the coming decades. The only infrastructure that is guaranteed to outlive us all is high-level radioactive waste. This leads us to critical questions such as, What and how should we rebuild? How do we build in the face of global climate change and sea level rise? Should we design for permanence or allow for failure? Can natural systems be integrated with technological

According to research produced for the landscape infrastructure symposium at Harvard in the spring of 2012, nearly all of our infrastructure will become obsolete in the coming decades. The only infrastructure that is guaranteed to outlive us all is high-level radioactive waste. This leads us to critical questions such as, What and how should we rebuild? How do we build in the face of global climate change and sea level rise? Should we design for permanence or allow for failure? Can natural systems be integrated with technological
structures? I am intrigued by the possibilities for landscape architects to work on aesthetically pleasing and sustainable solutions for the modernization of America’s transportation infrastructure.

My fascination with the precarious state of infrastructure in the US led me to develop my honors thesis. Over the course of a year, I researched, wrote, produced graphics, and presented on landscape infrastructure case studies related to Amsterdam, The Netherlands. Much of the current thinking about landscape infrastructure suggests that infrastructure is moving away from an exclusive focus on any single functionality. Landscape architects are focused on integration, designing systems to react to and function with natural as well as manmade environments.

In preparation for my fieldwork, I spent a semester conducting preliminary research and writing the proposal for my independent thesis. During this work it became clear that Amsterdam was an ideal location, a city as laboratory, in which to learn landscape infrastructure principles. There are few places in the world where infrastructure is more vital to human existence than in The Netherlands. The country sits at the northwest corner of the Great European Plain, and almost two-thirds of the country is at or below sea level. Over centuries, controlling water along rivers and the North Sea have allowed the Dutch to methodically reclaim land, first for farming and later for settlement. Dikes, levees, dams and other infrastructure have become fundamental parts of the Dutch landscape. Amsterdam, as the urban core of the Netherlands, offers several different transit typologies including elevated train tracks, underground metro, at grade trams, multimodal streets, and urban highways. This infrastructure has had a drastic impact on its surroundings.

I traveled to Amsterdam in the fall of my senior year and spent three months documenting the benefits and complexities of three case study locations that reflect a synergistic approach to landscape, infrastructure, and civic space.

From the three case studies, I came to understand and appreciate the value that flexibility, decentralization, and multidimensionality can bring to
an infrastructure project. These Dutch sites are in stark contrast to many American infrastructure projects of the mid to late 20th Century that were engineered primarily to serve vehicles. The trend for contemporary landscape infrastructure is to become decentralized and multimodal. Multifunctional infrastructure conserves land, shares the financial load of its development, restores damaged natural ecologies, reinforces healthy transit options, and provides public access to vital open space. I think that landscape architects are uniquely poised to expand this trend because the challenges call for sophisticated systems thinking in which landscape architects are trained and tested.

Firms are just starting to label their projects under the landscape infrastructure movement. In 2011, SWA of Los Angeles, California, produced a book containing case studies of their built projects they consider to be landscape infrastructure. The Olin Studio of Philadelphia, Pennsylvania developed an internship program and company journal around the movement. An international design competition was held 2010, that challenged landscape architecture firms to design highway infrastructure that served not only vehicles, but the sensitive wildlife of the Colorado Rockies. HNTB + Michael Van Valkenburgh & Associates won the competition with their proposal that combines landscape, ecology, and engineering into a solution that is both cost effective and sophisticated.

I hope to continue researching landscape infrastructure principles and how they may be applied in North American cities in graduate school. I plan on pursuing a dual Master’s degree in landscape architecture and architecture where I can explore the integration of the two disciplines. The distinction between architecture and landscape will be further blurred in the years to come as hybrid landscapes and buildings will be necessary for resolving the world’s biggest environmental issues. Landscape architects will be looked at to be leaders of the multidisciplinary teams needed to handle complex design problems.


Proposed wildlife crossing by Michael Van Valkenburgh that blurs the traditional distinction between landscape and infrastructure.
For more information about this project or other enquires please contact Zach at:
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Zachary Barker will graduate in May 2013 with Honors from State University of New York College of Environmental Science and Forestry with a Bachelor of Landscape Architecture degree. Throughout his studies, he has pursued extracurriculars, internships, and independent coursework relating to the revitalization of post-industrial urban landscapes. In his final year, Zachary completed his independent thesis project analyzing landscape infrastructure in Amsterdam, The Netherlands. Zachary would like to continue to explore the integration of landscape, infrastructure, and architecture as a professional and later as a graduate student. His recent experiences as a teaching assistant for sophomore design studio have solidified his desire to be involved in design education throughout his career. Zachary is a dual citizen of the United States and New Zealand and aspires to create sustainable and beautiful landscapes in both countries and worldwide during his career.