P4_Reflections

Infrastructural Topologies

Hueco-Mesilla Bolson Groundwater Infrastructural Hub

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**Graduation Project**  
Infrastructural Topologies:  
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**Introduction**

The thesis project is part of the graduation Studio “Borders. The Architecture of Violence” the object of interest of the studio is the international border between United States and Mexico. The border stretches between the two nations for more than 3100 km, from the Gulf of Mexico on the East, to San Diego/Tijuana before reaching the Pacific Ocean on the West. The border traverses a variety of landscapes and geographical conditions: major urban areas, miles away from each other, extensive agricultural developments stranded within inhabitable deserts, small frontier towns, grasslands, rivers and mountains. At the same time the border divides two colliding nations-systems. Both the ideological implications and the physical manifestations of the border in its infrastructure are responsible for defining an apparatus of systematic violence.

However, the fundamental premise of the Studio is discarding the notion of the U.S. – Mexico border as a line, but rather as a region, which is exactly the results of a manifest interdependence on cultural, political, and environmental levels.

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**The methodical Line of Approach of the Graduation Lab (Complex Project – Border Studio) and the Method Chosen by the Student in This Framework**

The studio work has been organized in such a way that most of the first semester has been dedicated to research. In this context, in the first month the studio has dealt with a process of research, analysis, and synthesis of hard data on all the scales intersecting the project site. During the first month a study on the region along the border between U.S.A. and Mexico, as well as a deeper focus on the conurbation of El Paso-Juarez and the Chamizal Area, has been conducted on many layers. Subsequently conclusions from this has been drawn, based upon initial fascination, which in turn opened the way for an investigation “on site” during the studio trip and the subsequent research conducted individually.

In this respect the personal research topic has been built upon both an initial interest on the peculiar character of infrastructure in the American cities – when compared to European examples –, as well as a fascination on the relation between infrastructure and landscape developed during the trip, with a particular attention on water infrastructure for its importance in sustaining the inhabitation of this region as well as its relevance in the contemporary debate.

The methodical line of approach developed in the Complex Project Studio sees as first and fundamental component, the development of a thorough investigation in the many layers which constitutes the anatomy of a context. In this sense, the anatomical dissection in hard data has been in the process the very material on which the region, the conurbation...
of El Paso/Juarez, and the Chamizal area – our specific site of intervention – has been unpacked and an initial basic understanding has been built. The personal focus on a specific research topic has been carried out along a similar line of approach in unpacking a condition inherent to the context in all its scale (Border Region, El Paso/Juarez, Chamizal), in order to build a comprehensive understanding, that will later serve to directly inform the project.

My approach on the personal research has been elaborated upon this methodological approach by intersecting hard data and mapping with investigation in soft layers, such as cultural studies, economic history, and contemporary media perception, in the relation between infrastructure and landscape.

This has culminated in one of the main sections of the research, that aims to present the ideological value that infrastructure assumes in the North American context in shaping both landscape and culture.

At the same time, the second part of the research unpack and investigates the water situation for all the scales taken in consideration, following a method of unpacking in layers, as already presented.

The research has been instrumental for constructing a narrative for the project, by serving as a fundamental tool for an objective approach. In doing this, the personal approach applied, takes the distance from a straightforward relation problem-to-solution between project and research, but rather explore the use of issues to offer a possibility to address and expose the argument.

**Relationship between Research and Design**

Within this frame the research investigates the phenomenology of the relation between infrastructure and landscape. The premises, upon which the thesis has been developed, considers infrastructure as any apparatus of systems, technologies, connections and works, upon which any expression of human inhabitation has been structured and continues to be reliant. Infrastructure becomes a tangible structuring device for human inhabitation; in doing so it becomes a material agent that marks deeply the natural environment. Thus, landscape is understood as the product of material – and immaterial – actions on the environment: it is the representation of the practical use of the physical world through infrastructure.

Inevitably and unavoidably, infrastructure changes fundamentally the original nature of a territory: the intrusion of the machine in the garden challenges the ecological system and the integration into the surrounding environment. The radical transformation and creation of landscapes through infrastructural development, with a radical alteration of landscapes is now a global phenomenon.

In the local dimension of the Border region and in particular the conurbation of El Paso-Juarez, the infrastructural apparatus that commands human inhabitation is water infrastructure, due to the necessity of it for structuring what otherwise would be close to a forbidding desert. The increasing challenges of the contemporary paradigm of infrastructural development, which is reliant on a continuous superimposition of muscular-hard infrastructure, has led to what is beginning to be considered a hyper infrastructural development, which is failing in its relation with the environment in sustaining an ever increasing inhabitation of this land.

In this respect the project propose the possibility of a diverse paradigm of infrastructural development that resets its relation with the landscape/environment towards an ecological integration of mechanical apparatuses and natural systems, namely Eco-infrastructure. This is materialized in an infrastructural intervention specific for the Hueco-Mesilla bolson – a network of aquifers laying beneath the area of El Paso-Juarez, both of which heavily rely on its water – composed of a constructed wetland for wastewater treatment and a management center. The intervention has been preceded by a thorough investigation of the “water situation” both for the Border region, and for the double city El Paso/Juarez. In this sense, the project has been informed by the research in its conceptual definition and programmatic development. However, the project does not act as a straightforward response to conclusions drawn from the research, but rather takes a fundamental critical stance towards it. In this sense the project is built upon an idea of duality for the water condition.
both for being an objective and unquestionable issue for the region, but also of possibility of employing different strategies for the infrastructural development and exploring the topic of an integration between infrastructure, landscape and architecture. The project addresses the issues of a general surface water crisis, the depletion of the border aquifers and the lack of bi-national cooperation in managing the latter, while counterposing the possibility using the saline water reserves of the aquifers, by promoting a cooperation for the good management of the border groundwater, and by employing the afore-mentioned concept of eco-infrastructures.

Thus, the intervention strategy focuses locally on the Hueco-Mesilla bolson, by implementing a sustainable strategy of recharge/withdrawal for the aquifer, while proposing the creation of a bi-national agency for the management of the border aquifers, along the lines of the already existing agency for the surface water shared by U.S.A. and Mexico, the IBWC (International Boundary and Water Commission).

The specific phenomenology of the cultural relevance of infrastructure in the American context, has been at the base of the specific architectural topic that the design explores. The ideological value of infrastructure becomes in the project a will of celebration both of water infrastructure and the different paradigm put in place, through an idea of monumentality built upon its duality with functionality. In this sense, functionality is used to make manifest an unresolved dialectics of all the elements of the form. Constructions, lines and spaces are now considered, brought forth, exposed and experienced, showing a quest for an architectural/spatial celebratory language that delivers the conflicting nature of the inherent duality for the infrastructure, the one of a functional machine and a monument ingrained in the cultural and natural landscape.

The research maintains a tight relation with project, and it is considered a tool in the design process for developing a contextual, site-considering and informed design, as well as initiating the discussion on the architectural topics that the project sets to investigate.

**Relationship between the Theme of the Graduation Lab (Complex Project – Border Studio) and the Subject Chosen by the Student within this Framework**

The theme chosen to further investigate in the thesis, fits within the broader theme of the studio, which sets to investigate the conditions of the border between two nations, USA and Mexico. The two nations are divided by one of the most discussed infrastructural borders, a device that it has been defined a proper example of “architecture of violence” (Noam Chomsky, 2013) Yet the two neighboring nations shows a relentless social, economic and political co-dependency. In fact the border is understood by the studio not as the line, nor as the actual physical device of implementation of this division, but rather as a vast, trans-boundary region, which is defined by shared cultural, economic, and geographical layers of complexity.

In this respect the topic of water infrastructure fits in the context of the many layers of shared needs between the two nations. The border is not addressed in its physical manifestation, by directly intervening on it, but rather it is addressed in the results of the implementation of such division in the surrounding region. Specifically water and water infrastructure is a transboundary component of the life in the region for it is one of the fundamental devices that make possible its inhabitation and prosperity. The two countries also shares the vast majority of the precious resource, while at the same time they lack collaboration in its administration. In this regard the project programmatically defines a structure of soft infrastructure able to function on a bi-national level, such as the establishment of a transboundary agency for groundwater management and water policies as well as a joint research center for expanding the possibility of existing techniques. The program express also the need – as well as the possibility – for a set of civic functions for institutionalizing with a proper form, issues stemming from the present controversies of addressing water rights.
The project relates to the broader social context already by addressing the topic of water and water infrastructure, due to its primary position in the economic engine of the region, the current inhabitation, as well as the future expansion of both. The contemporary situation of crisis is already threatening the social context of the region, therefore proposing infrastructures to deal with the issue has an effect also on a wider context. In this regard the project programmatically proposes the institution of soft infrastructural apparatuses for the management of the groundwater, as well as for the establishment of policies for water, mainly in a top-down way, but without leaving out the possibility of a bottom-up definition of those by providing the necessary infrastructure for their definition and implementation. This is expressed in the project by a set of functions defined as Civic components. In broader terms the project also addresses a fundamental character of the nature of the border between the two nations, which is the relentless disparity and exploitation of one side upon the other, by dealing with the shared need of water regulation and management.

At the same time investigating the possibility for a different infrastructural paradigm taps into the current debate on the future of infrastructure. The holistic approach of eco-structures, not as a label for greenwashing infrastructure, offers a kind of structuring network able to interact with the environment and all its constituent components. This approach leads to the conception of a kind of infrastructure that operates indeed as the backbone of human inhabitation through cultural, social and economic elements in tight collaboration with technological facilities, institutions, physical places and related services. The thesis is conducted under the fundamental notion that the future of infrastructure will not come through the practice of building hypertrophic infrastructural network. Indeed the advancement of progress and modifications of the environment in which we live, will still demand innovative solutions and technologies different from the traditional. While indeed we will building mag-lev trains, and driverless cars, to answer the demand of progress, none of this will succeed in being truly successful without a bankable environment able to manage the social, political, ecological and environmental sphere deeply intertwined with the physical manifestation of infrastructure. The possibilities of success for the next infrastructure will not be technical nor quantitative, but rather social, institutional and political.