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# UNIVERSIDADE DE ÉVORA

MESTRADO EM GESTÃO E VALORIZAÇÃO DO PATRIMÓNIO HISTÓRICO E CULTURAL - MASTER ERASMUS MUNDUS TPTI  
(Techniques, Patrimoine, Territoires de l'Industrie : Histoire, Valorisation, Didactique)

**The Dinamos of the Magdalena River in Mexico.  
A route through the industrial heritage  
of the XIX century.**

**Os Dinamos do Rio Magdalena no México.  
Um percurso pelo património industrial  
industrial do século XIX.**

**Elisa Angeles Fernández**

**Orientador/ Sous la direction de  
Ana Cardoso de Matos**

« This dissertation does not include criticisms and suggestions made by the jury. »  
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Évora September 2023

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## **Title**

### ***The Dinamos of the Magdalena River in Mexico.***

A route through the industrial heritage of the XIX century.

## **Abstract**

This thesis proposes a plan for the valorization of the industrial route that existed alongside the course of the Magdalena River in Mexico City, presenting the analysis of natural, historical, and cultural and socio-economic aspects around the study area with the objective of the development of a new proposal of an ecotourism park, that contemplates the heritage valorization criteria for the creation of a profitable and sustainable project.

**Keywords:** Hydroelectricity; Magdalena Contreras; Landscape; industrial heritage; valorization; ecotourism.

## **Título**

### ***Os Dinamos do rio Magdalena no México.***

Um percurso pelo património industrial do século XIX.

## **Resumo**

Este tesse propõe um plano de valorização da rota industrial que existiu ao longo do curso do rio Magdalena na Cidade do México, apresentando a análise dos aspectos naturais, históricos, culturais e socioeconómicos em torno da área de estudo com o objetivo de desenvolver uma nova proposta de parque ecoturístico, que contemple os critérios de valorização do património para a criação de um projeto rentável e sustentável.

**Palavras-chave:** Hidroeletricidade; Magdalena Contreras; Paisagem; património industrial; valorização; ecoturismo.

## Titre

### *Les Dinamos du fleuve Magdalena au Mexique.*

Une route à travers le patrimoine industriel du XIXe siècle.

## Résumé :

Ce travail propose un plan de valorisation de la route industrielle qui existait le long du cours de la rivière Magdalena à Mexico, en présentant l'analyse des aspects naturels, historiques, culturels et socio-économiques autour de la zone d'étude avec l'objectif de développer une nouvelle proposition de parc écotouristique, qui envisage les critères de valorisation du patrimoine pour la création d'un projet rentable et durable.

**Keywords :** Hydroélectricité ; Magdalena Contreras ; Paysage ; patrimoine industriel ; valorisation ; écotourisme.

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## Dedication.

Dedicated to my beloved parents, Pedro Angeles and Norma Fernández, for the opportunities and education they have provided me with.

To my talented sister, who always has a thoughtful comment saved along Tavian.

To my dear family, grandparents, aunts, uncles, and cousins, whom I missed seeing so much.

To my friends in Mexico, who listened to me and supported me throughout this journey.

To all my friends here and there, from whom I learned and who supported me.

And to my Pez, who walked with me in the forest.

安倍仲磨

天の原  
ふりさけば  
春日なる  
三笠の山に  
出でし月も

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## Abbreviations

<b>AHA</b>	<i>Archivo Histórico del Agua</i>	Historical Water Archive
<b>ANP</b>	<i>Área Natural Protegida</i>	Natural Protected Area
<b>CDMX</b>	<i>Ciudad de México</i>	Mexico City
<b>CISEN</b>	<i>Centro de Investigación y Seguridad Nacional</i>	National Intelligence Center of the
<b>CMCPI</b>	<i>Comité Mexicano para la Conservación del Patrimonio Industrial A.C</i>	Mexican Committee for the Conservation of Industrial Heritage
<b>CNMH - INAH</b>	<i>Coordinación Nacional de Monumentos Históricos del INAH</i>	National Coordination of Historic Monuments of the INAH
<b>CONABIO</b>	<i>Comisión Nacional para el Conocimiento y Uso de la Biodiversidad</i>	National Commission for the Knowledge and Use of Biodiversity
<b>CONACULTA</b>	<i>Consejo Nacional de la Cultura y las Artes</i>	National Council for Culture and the Arts
<b>CONAGUA</b>	<i>Comisión Nacional del Agua</i>	National Water Commission
<b>CONANP</b>	<i>Comisión Nacional de Áreas Naturales Protegidas</i>	National Commission of Natural Protected Areas
<b>CORENADR</b>	<i>Comisión de Recursos Naturales y Desarrollo Rural</i>	Natural Resources and Rural Development Commission
<b>DOF</b>	<i>Diario oficial de la Federación</i>	Official Journal of the Federation
<b>GDF</b>	<i>Gobierno del Distrito Federal</i>	Government of the Federal District
<b>GOCDMX</b>	<i>Gaceta oficial de la ciudad de México</i>	Official Gazette of Mexico City
<b>ICAHM</b>	<i>International Committee on Archeological Heritage Management</i>	
<b>ICCROM</b>	<i>International Centre for the Study of the Preservation and Restoration of Cultural Property</i>	
<b>ICOMOS</b>	<i>International Council on Monuments and Sites</i>	
<b>IMSS</b>	<i>Instituto Mexicano del Seguro Social</i>	(Mexican Institute of Social Security)
<b>INBAL</b>	<i>Instituto Nacional de Bellas Artes y Literatura</i>	National Institute of Fine Arts and Literature

<b>INEGI</b>	<i>Instituto Nacional de Estadística, Geografía e Informática</i>	National Institute of Statistics, Geography and Informatics
<b>INHA</b>	<i>Instituto Nacional de Antropología e Historia</i>	National Institute of Anthropology and History
<b>PAOT</b>	<i>Procuraduría Ambiental y del Ordenamiento Territorial</i>	Environmental and Land Management Attorney's Office
<b>PDDU</b>	<i>Programa Delegacional de Desarrollo Urbano para la Delegación</i>	Urban Development Program for the Delegation
<b>PGDU</b>	<i>Programa General de Desarrollo Urbano</i>	General Urban Development Program
<b>PM-ASCRM</b>	<i>Plan Maestro de Manejo Integral y Aprovechamiento Sustentable de la Cuenca del Río Magdalena</i>	Master Plan for the Integral Management and Sustainable Use of the Magdalena River Basin
<b>PPDU</b>	<i>Programas Parciales de Desarrollo Urbano</i>	Partial Urban Development Programs
<b>PSMV</b>	<i>Plan de sauvegarde et de mise en valeur</i>	Conservation and Valorization Plan
<b>PSMV</b>	<i>Plan de Sauvegarde et de Mise en Valeur</i>	Safeguarding and Enhancement Plan
<b>SACMEX</b>	<i>Sistema de Aguas de la Ciudad de México</i>	Mexico City Water System
<b>SAGAR</b>	<i>Secretaría de Agricultura, Ganadería y Desarrollo Rural</i>	Secretariat of Agriculture, Livestock and Rural Development
<b>SC</b>	<i>Suelo de Conservación</i>	Conservation Land
<b>SEDEMA</b>	<i>Secretaría del Medio Ambiente de la CDMX</i>	Secretariat of Environment of Mexico City
<b>SEDUMA</b>	<i>Servicio de Información Agroalimentaria y Pesquera</i>	Agri-food and Fisheries Information Service
<b>SEDUVI</b>	<i>Secretaría de Desarrollo Urbano y Vivienda</i>	Secretariat of Urban Development and Housing
<b>SMA</b>	<i>Secretaría del Medio Ambiente</i>	Secretariat of the Environment
<b>TICCIH</b>	<i>The International Committee for the Conservation of the Industrial Heritage</i>	
<b>UNAM</b>	<i>Universidad Nacional Autónoma de México</i>	National Autonomous University of Mexico
<b>UNESCO</b>	<i>United Nations Educational, Scientific and Cultural Organization</i>	



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# Introduction

The industrial heritage present on the Magdalena River once formed part of a pioneering industrial route in electrical production in Mexico City that operated from 1897 to 1950. The system included along other buildings and elements, four hydroelectric plants that used to work using the Magdalena River tributary, usually referred as the “*Dinamos*” due the turbines that produced electricity in its vicinity.

Although these *Dinamos* as well as other existing vestiges that conformed this route have been partially considered in the river rescue plans and other projects, the remnants survive with various degrees of deterioration. Moreover, their importance as part of a system that integrates them into a river landscape that could contribute to preserve and solve current problems is not seen.

The main interest in the subject lies in the proposal of valorization of the site and remaining buildings inside and outside the study area, from the state of vulnerability and ignorance in which this heritage is found; despite the multiple interventions in search of environmental improvement and social wellbeing, these historical elements full of potential for the development of the area has not been considered.

The proposal to value these vestiges is based on *Nizhny Tagil Charter*, dedicated exclusively to industrial heritage.

This work intends to analyze and understand this industrial route as a system, resulting from a historical stratification of cultural and natural values and attributes, with its elements related to the Magdalena River.

Evaluating its context: topography, geomorphology, hydrology, and natural features; its urbanized environment, both historic and contemporary; its infrastructure, open spaces and gardens, the configuration of land uses and their spatial organization; visual perceptions and relationships; and all other elements of the urban structure. It also includes social and cultural uses and values, economic processes, and the intangible aspects of heritage in its relationship to diversity and identity<sup>1</sup>, which are essential for enhancing and determining in a global and integrated way the path of its protection.

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<sup>1</sup> Defined in the «*Recommendation on the Historic Urban Landscape, including a Glossary of Definitions.* », UNESCO, Recovered 22 Mar 2023 from [www.unesco.org/en/legal-affairs/recommendation-historic-urban-landscape-including-glossary-definitions](http://www.unesco.org/en/legal-affairs/recommendation-historic-urban-landscape-including-glossary-definitions).

Therefore, this memory will highlight the elements that compose the industrial route along the Magdalena River, the history of its companies, the urban expansion, landscape, and legislation, among other topics, seeking to determine a system of relationships. Seeking to expand the projects of landscape architecture and industrial heritage valorization in Mexico. On the other hand, the results will allow contextualizing *Los Dinamos* and the Magdalena River industrial history in the universe of similar and contrasting experiences of industrial heritage in the world.

## **Problematic**

The problematic can be divided into four parts:

- What are the antecedents of these power plants, and what were the reasons for their construction?
- What is the link between the old power plants and the territory through the period of our analysis?
- How to approach enhancing this threatened heritage and integrating it into the natural park?
- Why is it essential to rehabilitate and give new use to these buildings?

## **Main Objective**

The main objective is to recognize the elements of an Industrial Landscape, a system, both its industrial and environmental elements, to highlight the importance and heritage value of the landscape of the Magdalena River. Taking into consideration its conservation and the possibilities of establishing criteria for managing them. Establish the criteria and means for the conservation and management of this heritage. Highlighting the role of industrial heritage as a contributor to the community's social, environmental, and economic development.

## **Specific Objectives**

The specific objectives are:

- Recognize the importance of this system in the Mexican industrial heritage, its contributions, and particularities.
- Discuss measures to enhance this heritage and the feasibility of their application in Mexico.

- Discuss and identify social integration strategies to sensitize inhabitants to the values of their territory, highlighting the creation of identity and a sense of ownership around the hydroelectric system.

To achieve the proposed objectives, the intent is to characterize the context of the study area, explaining its geographic and historical context of the establishment of the power plants, describing and documenting the hydroelectric system of the Magdalena River and its function, identifying a national and international legal framework for the methodological aspects related to industrial heritage and landscape notions and recognizing the heritage elements of the Magdalena River hydroelectric system that exist today.

Attempting to:

*“Identifying, conserving and managing historic areas within their broader urban contexts, by considering the interrelationships of their physical forms, their spatial organization and connection, their natural features and settings, and their social, cultural and economic values.”<sup>2</sup>*

Fortunately, the four *Dinamos* are classified by the *Instituto Nacional de Antropología e Historia* - INAH (National Institute of Anthropology and History) in the material, architectural, industrial-historical-cultural heritage<sup>3</sup>, still, they are not considered as a specific future project to be rehabilitated and therefore valued. There were projects envisaged the rehabilitation of the 18th-century building in the area *La ex-hacienda de la Cañada*<sup>4</sup> for its conversion into a cultural center for the following reason:

“... catalogued as heritage by the INHA gives it great potential for its recovery and conservation...”<sup>5</sup> also “...It is necessary to create conservation and enhancement measures that allow the dissemination of culture and give identity to the community, highlighting the cultural, historical and social impact of the site as heritage in the public domain.” (SMA-GDF, 2008).

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<sup>2</sup> Ibid

<sup>3</sup> See Appendix 1

<sup>4</sup> *Haciendas* are homesteads set on rural and agricultural land, especially one used for farming or ranching.

<sup>5</sup> Secretaria del Medio Ambiente *Reporte de investigación para el Diagnóstico sectorial de la cuenca del río Magdalena, componente 12. Patrimonio Histórico cultural* in «Plan Maestro de Manejo Integral y Aprovechamiento Sustentable de la Cuenca del Río Magdalena» p. 460, 2008.

Equally, the four *Dinamos* are catalogued by the INHA, and they are an identity element in the region, even the park that bears its name, so why are there no actions to preserve it or projects that contemplates them and its history as well?

## State of the art

Regarding the site of study, great efforts have been focused on ecological and hydrological rescue due to its location in the Forest Park on protected land and beside the Magdalena River. Therefore, literature regarding natural resources-biodiversity, socio-economic information in the region, statistical information and other reports are accessible due the *Plan Maestro de Manejo Integral y Aprovechamiento Sustentable de la Cuenca del Río Magdalena* - PM-ASCRM, 2008, (Master Plan for the Integral Management and Sustainable Use of the Magdalena River Basin)<sup>6</sup>, such as the one written by Taty Pérez<sup>7</sup>.

For this work the environmental studies and base information for the maps provided principally form the institute on charge of the generation of stiles and cartography in Mexico named *Instituto Nacional de Estadística, Geografía e Informática* - INEGI, (National Institute of Statistics, Geography and Informatics), as well as information provided by the *Secretaría del Medio Ambiente* - SMA (Secretariat of the Environment)<sup>8</sup> and municipalities such as the Magdalena Contreras, like maps, and development programs.

Concepts, definitions and principles stated by international organizations and taken as a theoretical and methodological basis, such as United Nations Educational, Scientific and Cultural Organization - UNESCO<sup>9</sup>, The International Committee for the Conservation of the Industrial Heritage - TICCIH, or the International Council on Monuments and Sites - ICOMOS, in the documents *Carta de Monterrey*<sup>10</sup> (2006), *The Dublin Principles*<sup>11</sup> (2011),

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<sup>6</sup> UNAM, SMA-GDF, «*Plan Maestro de Manejo Integral and Aprovechamiento Sustentable de la Cuenca del Río Magdalena*» 2008. Highlighting its components: 9. Espacios abiertos urbanos, 10. Espacio natural y rural, 12. Patrimonio histórico cultural.

<sup>7</sup> Taty Pérez Barceló C., «*Zonificación de riesgo en el parque de Los Dinamos, asociado a amenazas por inestabilidad de la capacidad de respuesta de los usuarios valorada a partir de su percepción de riesgo*», Thesis of geography, Universidad Nacional Autónoma de México, Facultad de Filosofía y Letras, 2015.

<sup>8</sup> SEDEMA (Secretaría del Medio Ambiente del Distrito Federal), *Suelo de Conservación*, México, 2016.

<sup>9</sup> UNESCO, *Recommendation on the Historic Urban Landscape, Including a Glossary of Definitions*. Recovered Mar. 2023, from: <https://whc.unesco.org/document/160163>

<sup>10</sup> TICCIH, *Carta de Monterrey* sobre “Conservación del Patrimonio Industrial”, 18 of November 2006. Recovered: Mar. 2023, from: [https://ticcih.org/about/countries/carta\\_monterrey/](https://ticcih.org/about/countries/carta_monterrey/)

<sup>11</sup> ICOMOS – TICCIH, *The Dublin Principles*, 28 November 2011.

Recovered: Mar. 2023, from: <https://ticcih.org/about/about-ticcih/dublin-principles/>

*Carta de Nizhny Tagil*<sup>12</sup> (2003) and *European Landscape Convention*<sup>13</sup> (2000), that define problems and orientations narrowly linked to a national and international framework, heritage and landscape, that seeks to promote actions of recognition, support, enhancement and dissemination of heritage, that in later chapters will be referenced.

Regarding industrial heritage, analogous cases, concepts of valorization, authors like Angelique Trachana<sup>14</sup>, Prat Forga<sup>15</sup>, Giovanni Fontana<sup>16</sup> Engelking Keeling<sup>17</sup>, García y Corbett<sup>18</sup>, Humberto Morales<sup>19</sup>, Mazari and Meza<sup>20</sup>, Niccolai Sergio<sup>21</sup> deal with issues that, if they were identified and applied in the study area, would add potential and the basis for establishing a management plan and strategies.

Regarding the history of the study area, there are documents and studies that contain information about the factories, the production, the uses of the river and life of the workers of the factories such as the multiples articles and books, highlighting the works from Trujillo

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<sup>12</sup> TICCIH, *Carta de Nizhny Tagil* sobre patrimonio Industrial, 17 of July 2003. Recovered from: [https://ge-iic.com/files/Carasydocumentos/Carta\\_de\\_Nizhny\\_Tagil.pdf](https://ge-iic.com/files/Carasydocumentos/Carta_de_Nizhny_Tagil.pdf)

<sup>13</sup> Council of Europe, *Convention européenne du paysage*, Florence, 2000.

<sup>14</sup> Trachana, Angelique, «La Recuperación de los Paisajes Industriales como Paisajes Culturales, Ciudades», *Ciudades*, (14), 2011, pp. 189-212. <https://doi.org/10.24197/ciudades.14.2011.189-212>

<sup>15</sup> Prat Forga, José M<sup>a</sup>, *El turismo Industrial como elemento de revalorización del territorio: Un análisis desde las relaciones sociales presentes en los destinos*, Doctoral Thesis, Departamento de Geografía, Universidad Autónoma de Barcelona, España. 2013.

<sup>16</sup> Fontana, G. L. (2013). *Historia del Patrimonio Industrial. Objetos y metodología*. En G. L. Fontana, Del objeto al sistema. Padova: Università degli Studi di Padova.

<sup>17</sup> Engelking K. Segismundo, «La arquitectura industrial mexicana del siglo XX. Como problema de conservación; Un caso de estudio en la ciudad de México», in *Arqueología industrial y patrimonio*, Universidad Autónoma Chapingo, 2018.

<sup>18</sup> García Nelly, Corbett Jack, « Heritage Resource Management in Mexico », in *Cultural Heritage Management: a global perspective*, University Press of Florida, 2011.

<sup>19</sup> Morales Humberto, « Les Écomusées du patrimoine industriel au Mexique : des institutions encore actuelles ? », in *e-Phaistos*, Revue d'histoire des techniques, 2020.

<sup>20</sup> Mazari Hiriart, Marcos, Meza Paredes, Michelle, *Conservación de ecosistemas naturales en el medio urbano, intervenciones para el rescate del paisaje natural y del patrimonio histórico en México, problemas y perspectivas para su conservación*. Ponencia llevada a cabo en: Los bienes culturales y su aportación al desarrollo sostenible Facultad de Económicas, Universidad de Alicanten, España, 2012.

<sup>21</sup> Niccolai Sergio, «El patrimonio industrial histórico de México y sus fuentes», dans *América Latina En La Historia Económica*, n° 23, 2005.pp. 61-73.

Bolio<sup>22</sup>, Becerril Montero<sup>23</sup>, Camarena Mario<sup>24</sup>, Gamboa Leticia<sup>25</sup>, and Parra Alma<sup>26</sup> who are a strong source within the chapters that develop historical issues related to the industry of the territory.

Other authors who contributed to the historical study were García G. and Melesio M.<sup>27</sup>, Galindo José<sup>28</sup>, Ibáñez González<sup>29</sup>, Muñoz Gómez<sup>30</sup>, Toscano, Ricardo<sup>31</sup>, Zamora Saenz<sup>32</sup>.

Regarding the legislation and cultural politics in Mexico, a review was carried out starting with the Mexican Constitution and laws<sup>33</sup> related to the protection of natural and historical heritage. The Urban development programs of Magdalena Contreras<sup>34</sup> agreements<sup>35</sup> and texts like García Nelly and Corbett Jack<sup>36</sup>, Thomas and Melé<sup>37</sup> were used in order to describe the issues and problems about the land property, and politics issues concerning the area of study.

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<sup>22</sup> Trujillo Bolio Mario, *Empresariado y manufactura textil en la Ciudad de México y su periferia: siglo XIX*, México, CIESAS, 2000. And Trujillo Bolio Mario, «La manufactura de hilados y tejidos en la historiografía mexicana, siglos XVIII y XIX. Obrajes, protoindustrias, empresariado y fábricas textiles», in *Secuencia*. n°97, 2017, pp. 30-60.

<sup>23</sup> Becerril Montero J. Gustavo, «El proceso de construcción de estaciones productoras de energía eléctrica. El caso de las fábricas Santa Teresa y La Hormiga, 1896-1907», in *Boletín de monumentos históricos*, n°16, Instituto Nacional de Antropología e Historia, 2009. Pp. 180-191

<sup>24</sup> Camarena Ocampo Mario, *Jornaleros, Tejedores y Obreros. Historia social de los trabajadores textiles de San Ángel (1850-1930)*, Plaza y Valdes, México, 2001, p.32.

<sup>25</sup> Gamboa Ojeda Leticia, « Les entrepreneurs de barcelonnette au mexique : les particularités d'une chaîne d'immigrants en amérique (1840-1914) », *Entreprises et histoire*, 2009/1 (n° 54)

<sup>26</sup> Parra Alma, « Los orígenes de la industria eléctrica en México. Las compañías británicas de electricidad (1900-1929) », in *Historias*, núm. 19, october-march, 1988. pp.139-157

<sup>27</sup> García García, Melesio, *La Magdalena Contreras, D. F., su historia*, México Tesorería del D.D.F.

<sup>28</sup> Galindo, José. *El movimiento obrero, el proteccionismo y la legislación laboral. Efectos en una empresa textil del Distrito Federal en la primera mitad del siglo XX*. Publicación trimestral, Departamento Académico de Estudios Generales Instituto Tecnológico Autónomo de México (DAGE-ITAM) “Estudios, filosofía, historia, letras” N°102., Vol. X, 2012.

<sup>29</sup> Ibáñez González L. Antonio, «Trazas y trazos de la infraestructura eléctrica porfiriana en la ciudad de Puebla», in *La electricidad y la transformación de la vida urbana y social*, Universidad de Évora, 2019.

<sup>30</sup> Muñoz Gómez M. Elizabeth, «La vivienda obrera de la fábrica de papel Loreto. Patrimonio industrial de la ciudad de México en peligro de extinción», in *Intervención. Revista Internacional de Conservación, Restauración y Museología*, n°10, 2014. pp.30-46

<sup>31</sup> Toscano, Ricardo, *Descripción geográfica del Distrito Federal*, Revista Mexicana de Geografía, t. I, número 2, 1940. pp.103-108.

<sup>32</sup> Zamora Saenz I. Benedicto, «Dos modelos de gestión en la historia del río Magdalena, Ciudad de México. El repartimiento colonial y la Junta de Aguas», in *Cuicuilco* (Revue de sciences anthropologiques), México, vol. 25, n° 71, 2018.

<sup>33</sup> Gaceta Oficial de la Ciudad de México, « *Ley de Patrimonio Cultural, Natural y Biocultural de la Ciudad de México*», Last amendment published in the G.O.CDMX October 27, 2022

<sup>34</sup> Diario Oficial de la Federación, *Programa Delegacional de desarrollo urbano de Magdalena Contreras*, 1997.

<sup>35</sup> Diario Oficial de la Federación, *Acuerdo que declara Zona Protectora Forestal los bosques de la Cañada de Contreras, México*, 1932.

<sup>36</sup> García Nelly, Corbett Jack, « Heritage Resource Management in Mexico », in *Cultural Heritage Management: a global perspective*, University Press of Florida, 2011, chap. 8.

<sup>37</sup> Tomas Francois, Melé Patrice, « Patrimoine et action publique au centre des villes mexicaines », in *Caravelle*, n°73, 1999. pp. 331-333



As well as comparisons like the *Plan de Sauvegarde et de Mise en Valeur* - PSMV, (Safeguarding and Enhancement Plan).<sup>38</sup>.

Most recently the Master Sinhue Lucas Landgrave, transmitted in January 2023, a video conference titled *Importancia de los asentamientos industriales del río Magdalena* (Importance of the industrial settlements of the Magdalena River) on the Neltiliztli YouTube channel.<sup>39</sup> The presented work addresses topics aligned with this research. However, we believe that his approach will be linked, due to his profile as an archaeologist and his studies in Mesoamerican and architecture, to the development of specific projects with an approach to the population and oral memory. Unlike ours, which focuses more on the industrial landscape and heritage. As the master himself mentions in his video about works related to this territory, research of this kind has great potential, and there is much more to explore.

## Methodology

The work methodology will analyze and interrelate environmental, cultural, and socioeconomic factors related to the study area, from *La Cañada de los Dinamos* (where the object of study is located) along the course of the Magdalena River to its end as an open river in *Los Viveros de Coyoacán*. The course of the Magdalena River (the river basin) is part of the study area in a historical perspective due to its great importance in economic, social, cultural and ecological terms in the region. Its study is fundamental to understand and preserve the heritage of *Los Dinamos*.

For this, it is intended to use the reference bibliography, dissertations, theses, testimonies, and documents like the ones consulted in the *Archivo Histórico del Agua* - AHA, (Historical Water Archive), and iconographic resources such as cartography and photography consulted in the *Mapoteca Orozco y Berra de la Ciudad de Mexico* (Orozco y Berra Map Library in Mexico City), the Mediateca del INHA, in the AHA, and in the *Catálogo Nacional de Monumentos Históricos Inmuebles* (National Catalog of Historic Real Estate Monuments) and

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<sup>38</sup> The PSMV for its abbreviation in French of Plan of Safeguarding and Development, is the urban planning document applicable to the historic heart of the city of Troyes

<sup>39</sup> Landgrave, Sinhue y Neltiliztli. «Importancia de los asentamientos industriales del río Magdalena por Sinhue Lucas Landgrave». *YouTube*, 17<sup>th</sup> of January 2023, [youtube.com/watch?v=yBvvTR3bbNc&feature=sharea](https://www.youtube.com/watch?v=yBvvTR3bbNc&feature=sharea). Accessed 12<sup>th</sup> of July 2023.

Digital files and libraries, as well as material recollected by means of field visits carried out prior to the start of the master's program as part of the proposal for the development of this work, like photographs and maps.

The analysis and interpretation of these sources focuses on identifying the elements associated with the territory, history, architecture, and heritage of the case study to make a proposal for its heritage value. As well as the characterization of the urban, economic, political, social, and industrial context, which accompanies the history of *Los Dinamos* and the textile and electrical industry in the southern zone of Mexico City, is one of the objectives of this work. Due to the variety of aspects required, archival sources such as annual business news, magazines, cultural and scientific maps and architectural plans are also consulted.

The work uses the resource of mapping to synthesize not only the biophysical conditions of the Magdalena River basin was analyzed, but different layers of data like specific guides and bibliography.

### **Structure of dissertation**

The work is divided in four chapters, being the first about the geographical and historical characterization of the region of *Magdalena Contreras*. This first chapter contain the presentation of the object of study and the antecedents of the site. This part presents the area of study, also describe the description of the biophysics conditions of the area and the relation of the resources with the pre-industrial past of the site.

The second chapter titled “The creation of the power system of the Magdalena River and its evolution until today” will develop the industrial historical system enhanced by the river, focused se in the development of the industry in the area of study and locating the heritage elements to allow in the third chapter the comparison between the past and the existing heritage today in the Magdalena system.

Therefore, the third chapter consists in a bibliographic review of concepts about industrial heritage and the identification the of the existing heritage today in the Magdalena system, notions of the modification of the landscape, and heritage. The description of the condition of the *Dinamos*, and its mapping alongside the spatial characteristics, photographic survey, diagnosis and state of conservation.

The fourth chapter titled Industrial Heritage Preservation: Actors, Jurisdiction and Rezoning of Industrial Landscapes. presents the framework of industrial heritage and its legal

connotations in Mexico, making a bibliographic review of the national politics of safeguarding heritage as well as the comparison with the international framework and the analysis of the current situation in the site of study is presented.

Finally in the last part of chapter four, analyses an analogous case of study and reflexes on the criteria, elements, and plans that could be proposed or applied in a plan of management and a proposal of safeguarding the study area. Also, this chapter presents a proposal for the safeguarding of the industrial heritage *Los Dinamos*.

# **Chapitre I. Caractérisation géographique et historique de la région de Magdalena Contreras.**

## Résumé

Le développement de ce chapitre vise à définir la zone d'étude et à donner un contexte général, centré dans ce premier chapitre sur le territoire où se trouve *Los Dinamos*, à analyser les aspects environnementaux et historiques dans la région, en particulier autour du bassin de la Rivière Magdalena où se situe l'étude de cas, *Los Dinamos*, avec l'objectif de fournir une vue d'ensemble du territoire et de mettre en évidence la richesse des aspects historiques et naturels du site d'étude.

# Chapter I.

## Geographical and historical characterization of the region of Magdalena Contreras.

The development of this chapter aims to define the study area and give a general context, focused in this first chapter in the territory where *Los Dinamos* are found, analyze the environmental and historical aspects in the region, specifically around the Magdalena River basin where the case study is located, *Los Dinamos*, with the objective of provide an overview of the territory and highlight the richness of the historic and natural aspects of the site of study.

### I. Presentation of the study area

#### Biophysical composition of the Magdalena River basin.

The object of study, *Los Dinamos*, are located in Mexico, in the municipality of Magdalena Contreras also known as Magdalena Atlitic, which by its toponymy means "stone that drinks water", within the Magdalena River hydrological basin<sup>40</sup>.

La Magdalena Contreras is a municipality located in the southwest zone of Mexico City, located between 19 ° 13' and 19 ° 20' North latitude and 99 ° 12' and 99 ° 19' West longitude, with an altitude that varies between 2,300 and 3,760 meters above sea level.<sup>41</sup>

The municipality is composed of 74.58 km<sup>2</sup> of which 1,348 Ha (17.95%) are urban areas and 6,853 Ha (80.05%) are part of the conservation land that extends through four other municipalities and a federal state. The northern end of the municipality is urbanized. The rest of Magdalena Contreras, with its mountains and ravines, is designated as a conservation area. However, urban expansion has put pressure on these conservation areas. It is bordered on the north by the municipality of Álvaro Obregón, on the west again by Álvaro Obregón and the State of Mexico, on the south by Tlalpan and on the east by Tlalpan and Álvaro Obregón. *Los Dinamos* are part of the Eco-touristic park with the same name, also known as the *Bosque de la Cañada*, *Zona Protectora Forestal del Rio de la Magdalena* or *Zona Protectora Forestal Cañada de Contreras* (La Cañada Forest, Magdalena River Protected Forest Zone and Cañada

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<sup>40</sup> See *Figure 1*.

<sup>41</sup> Programa Delegacional de Desarrollo Urbano para la Delegación La Magdalena Contreras, 2005.

de Contreras Forest Protected Zone), by virtue of its legal consideration as an *Area Natural Protegida* – ANP (Natural Protected Area) and being part of *Suelo de Conservación* – SC (Conservation Land)<sup>42</sup>. *Los Dinamos*, also are part of communal<sup>43</sup> property<sup>44</sup>.

**Table 1. Identification of the object of study.**

Country	Mexico
State and municipality	Mexico City, Magdalena Contreras,
Name of the property	Parque ecoturístico “ <i>Los Dinamos</i> ”
Geographical coordinates	19°20'00"N 99°12'50"O
Area	1.200 Ha

Elaborated by the author based on INEGI and Google Earth.

While the park is composed by different areas, the ones that concern us are those that contains the remnants of the hydroelectric plants. These areas are named after the plants that reside inside, in total four *Dinamos*.

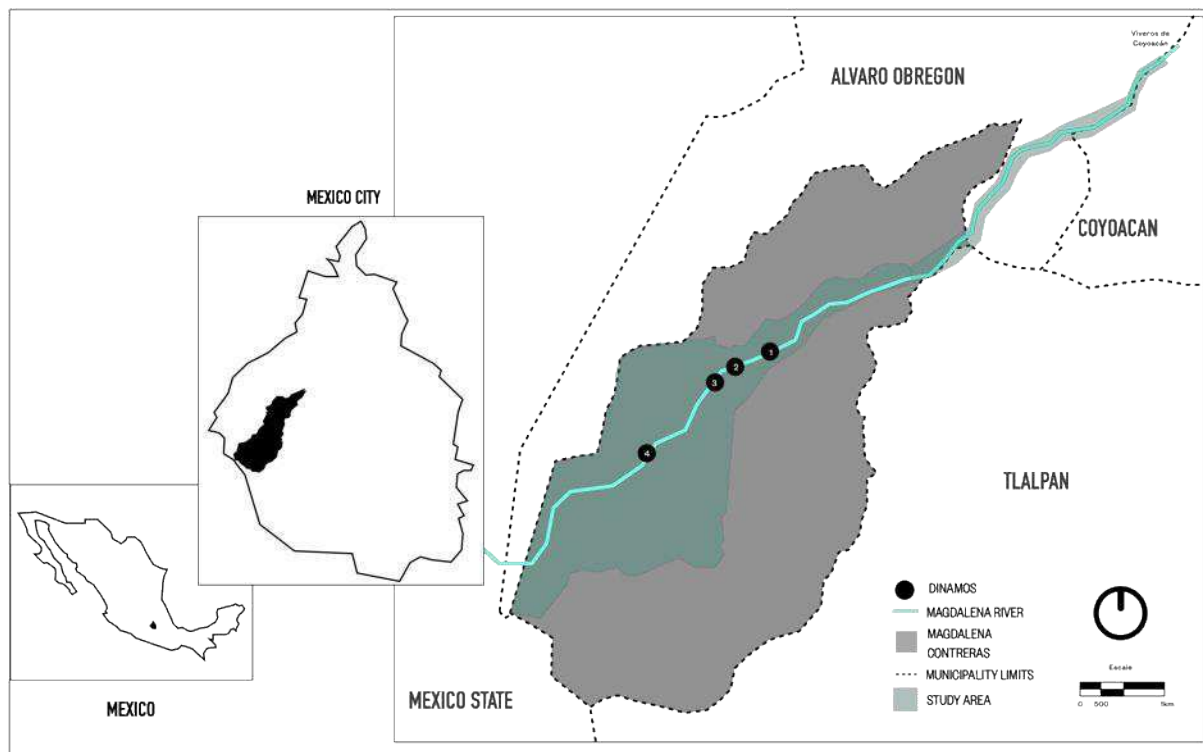
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<sup>42</sup> Refers to areas that, due to their ecological characteristics, provide environmental services necessary for the maintenance of the quality of life of the inhabitants of Mexico City, in accordance with the provisions of the Environmental Law of the Federal District.

<sup>43</sup> Magdalena Contreras was communal and ejido social property, granted since 1535, which were recognized as "communal property" in the 20th century during the agrarian distribution.

<sup>44</sup> Registro Agrario Nacional, *Tenencia de la tierra. Límites aproximados*, 2000, official validity, scale 1:50 000. Mexico

**Figure 1. Identification of study area**



Elaborated by the author based on INEGI.

The study area, on the other hand, not only includes part of the ecotourism park's property, but also part of the Magdalena River basin, which contains the river's diversion channels, and the rest of the river's course once it has left the municipality that mainly contains it, covering the municipalities of *Alvaro Obregón* and *Coyoacán* in a linear way along with the river.

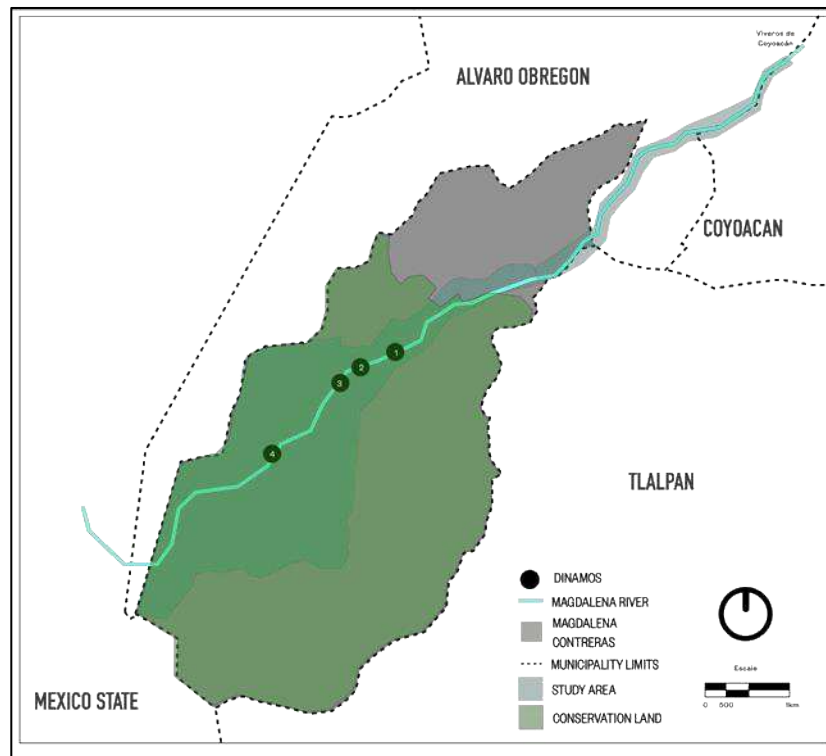
The course of the Magdalena River is of great importance in this work because it is the axis that configured the location of the textile industry in the south of Mexico City and can be considered as part of the study area in terms of historical antecedents, which will be addressed in the following section and Chapter 2.

The four *Dinamos*, as its going to be further explained in Chapter 4, are contained in a multiple layer of legal demarcations, and having thus, multiples denominations, being the common denominator of all of them being an area for the conservation of the green land in the city. As shown in Figure 2, around the 80% of the municipality is delimited as conservation land.

The first Dinamo is not accessible, but it's near the park of "*La Cañada*" a large area to practice recreational activities and has access to the Magdalena River. The second and third Dinamo are very close to each other, they are located about two kilometers from the first Dinamo, and their only land access remains the *Emilio Carranza* highway to the second

Dinamo, the third one has access by trails in the park. The fourth Dinamo is located about three kilometers from the second and third Dinamo accessible by the Emilio Carranza highway. The locals and recreational activities as well as the protection of the forest in the park are managed by the community members.

**Figure 2. Area of study and Conservation Land delimitation.**



Elaborated by the author based on INEGI, Dirección General de Medio Ambiente y Ecología and Google Earth.

*a. Hydrology, relief, and topography*

The Magdalena River basin is located in the southwestern limit of the Mexican basin within the Transmexican volcanic belt on the western slope of the *Sierra de las Cruces* and it occupies an area of 2,993 ha (30 km<sup>2</sup>) in its natural area, which corresponds to the "*Zona Protectora Forestal Cañada de Contreras*"<sup>45</sup>. The topography composed by hills and mountains are separated by numerous ravines and canyons from which flow rivers and freshwater springs. Some of them flow all year round and others only during the summer rainy season. The Magdalena River is one of them and constitutes the axis of development of this region and is one of the last remaining open-air rivers in Mexico City.

<sup>45</sup> Lucia Almeida Leñero, et. al, « *Historia Natural Y Cultural De La Cuenca Del Río Magdalena, Ciudad De México* », 1st ed., vol. 1, Universidad Nacional Autónoma de México, Facultad de Ciencias., 2018, p. 22.

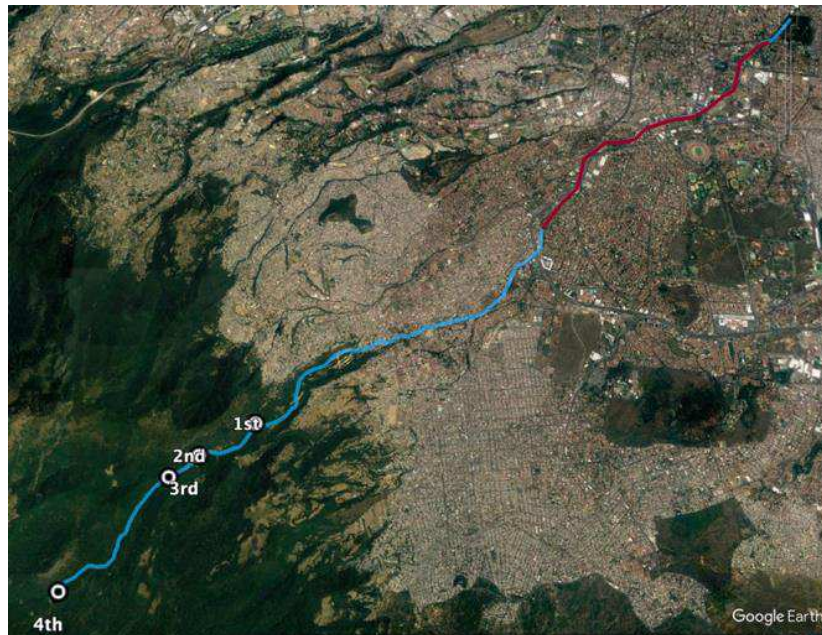


The Magdalena River starts from the *Cerro de San Miguel* at the altitude of 3600 meters, in the *Sierra de las Cruces* of the municipality of Cuajimalpa de Morelos, and is fed by streams located inside the hydrological basin.<sup>46</sup> It is part of the Moctezuma River system and flows into the Mixcoac River.

In the Magdalena riverbed there is a water treatment plant in the immediate vicinity of the first Dinamo. After the "Cañada", the river enters the urban zone, joining the Eslava River and continuing until it reaches the Anzaldo dam, where it is piped and continues its course under the Churubusco River Avenue, towards Panzacola and the Viveros de Coyoacán where the river returns to the open air. The river continues its journey until it flows into the Tula River basin through the artificial tunnels of Tequisquiác<sup>47</sup>. In the *Figure 3* shows the course of the river to the Viveros de Coyoacán.

The Magdalena River has a length of 28 kilometers and a width that varies between 8 meters and is not much higher than 17 meters in its widest parts. Its flow is permanent and varies between the dry and rainy seasons with a current between

**Figure 3. The course of the Magdalena River.**



Elaborated by the author by Google Earth. Blue shows the course of the river in the open air, while red shows the piped river.

<sup>46</sup> Taty Pérez Barceló C., «Zonificación de riesgo en el parque de Los Dinamos, asociado a amenazas por inestabilidad de la capacidad de respuesta de los usuarios valorada a partir de su percepción de riesgo», Thesis of geography, Universidad Nacional Autónoma de México, Facultad de Filosofía y Letras, 2015. chap. 2, p. 37-68.

<sup>47</sup> Ibid, p. 25.

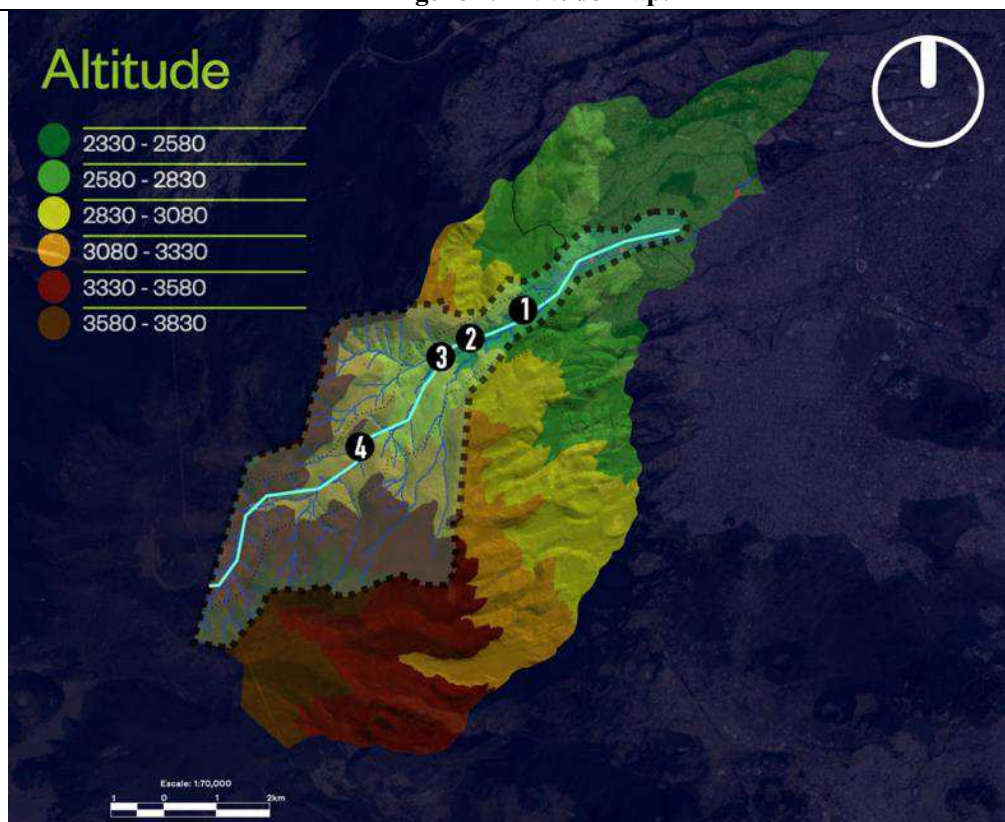
**Table 2. Identification of the Magdalena River**

Magdalena River	
Location	Mexico City
River system	Río Moctezuma
Outflow over	Río Mixcoac - Río Churubusco - Río Pánuco - Golf of Mexico
Source	Cerro de San Miguel (Cuajimalpa)
Altitude of the source	3600 m
Longitude	28 km
River width	8 m - 17 m
Flow	Permanent - 1 m <sup>3</sup> /s up to 20 m <sup>3</sup> /s.

Elaborated by the author based on INEGI

The altitude (fig. 3) within the area that makes up the basin, varies within the two thousand three hundred and thirty the lowest zone (2.330 m), to the northeast and three thousand eight hundred and thirty the highest zones to the southwest (3.830 m).

**Figure 4. Altitude map.**



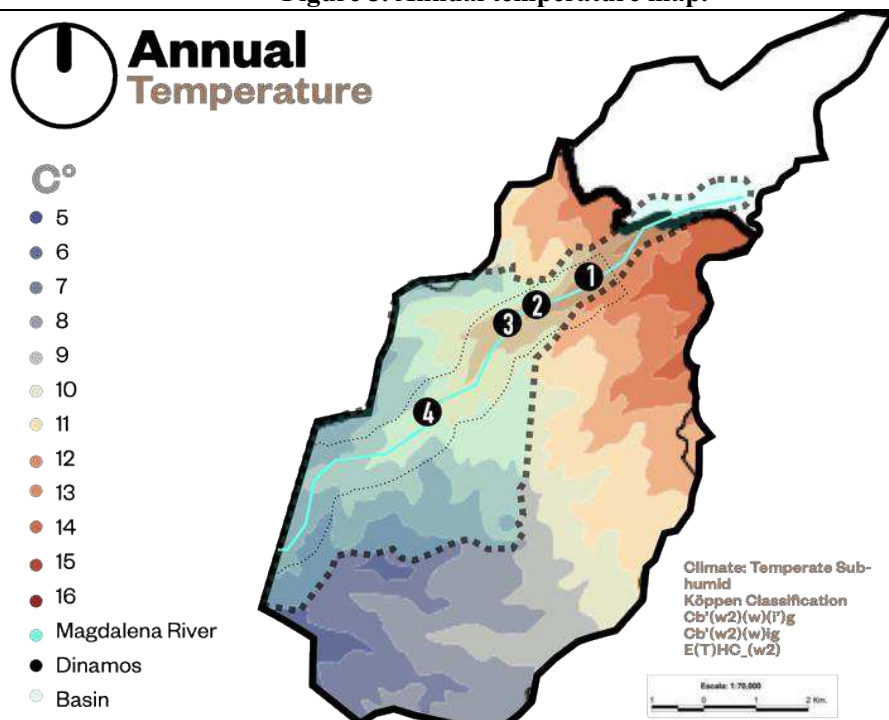
Elaborated by the author based on INEGI, Dirección General de Medio Ambiente y Ecología and Google Earth.

b. Climate

This zone regularly has trade winds from the northern hemisphere. In summer, after crossing the Gulf, they bring with them precipitation caused by the cooling of the wind and its humidity as it ascends the mountain slopes; in winter, the trade winds weaken, so there is a dry season at that time of year<sup>48</sup>. In the Köppen classification:

- **Cb'(w2)(w)(i')g** Temperate sub-humid with summer rains. There is a small fraction that corresponds to 42.50% of the territory, to the northeast of the delegation.
- **Cb'(w2)(w)ig** Semi-humid sub-humid with higher humidity summer rains. It is present in 54.38 % of the area of the delegation, in the zone of hills and the mountainous zone, from 2,900 to 3,400 meters above sea level.
- **E(T)HC\_(w2)**. Cold with abundant rainfall in summer. It covers 3.12 % of the territory, in the highest parts of the mountainous zone, from 3,400 to 3,760 meters above sea level.<sup>49</sup>

Figure 5. Annual temperature map.



Elaborated by the author based on INEGI, Dirección General de Medio Ambiente y Ecología and Google Earth.

<sup>48</sup> Ibid, p. 33.

<sup>49</sup> Secretaría de Protección Civil, *Mapa de Riesgos de la Delegación La Magdalena Contreras*, 2014, p.36.

The temperate in area in its lower parts reach an average temperature between 12 and 18 °C, while in the higher areas the climate is very cold, reaching the E classification, with a temperature of five to 12 °C.

*c. Vegetation, land use and Landforms*

Due of the volcanic origin of the area, the site of study has a great variety of vegetation but predominate:

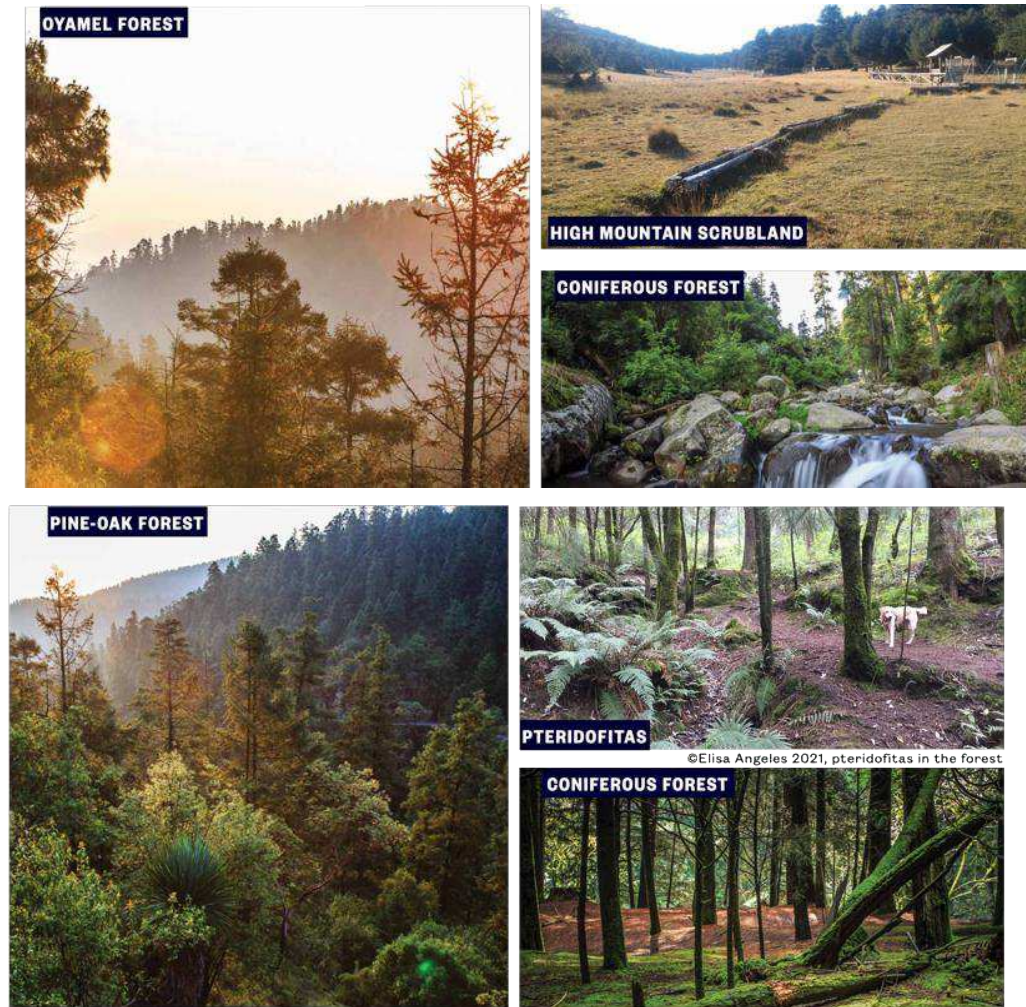
- Pine forest. This forest is found between 2,700 and 2,800 meters above sea level. It consists of diverse vegetation associations where species of the *Pinus* genus prevail and whose height ranges between 8 and 15 m. In the shrub stratum it is common the development of plants adapted to altered environments, while in the lower stratum grasses (*Muhlenbergia*, *Bromus* and *Stipia*) and composites (*Steviaspp*, *Archibaccharisspp*, *Salvia spp.*) predominate.
- Oyamel forest. It is located between 2,700 and 3,500 masl. The dominant species is *Abies religiosa*.
- Holm oak forest. It is located between 2,500 and 2,800 masl. It is made up of different types of oaks such as: *Quercus laurina*, *Q. mexicana*, *Q. crassifolia*, *Q. laeta*, *Q. deserticola*, *Q. rugosa* and *Q. crassipes*.<sup>50</sup>

In the study area there are also present: high mountain pasture vegetation, pteridophytes forest and in some parts agriculture is practiced. (fig. 5)

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<sup>50</sup> Ibid. p.40

Figure 6. Vegetation ecosystems in the river basin.

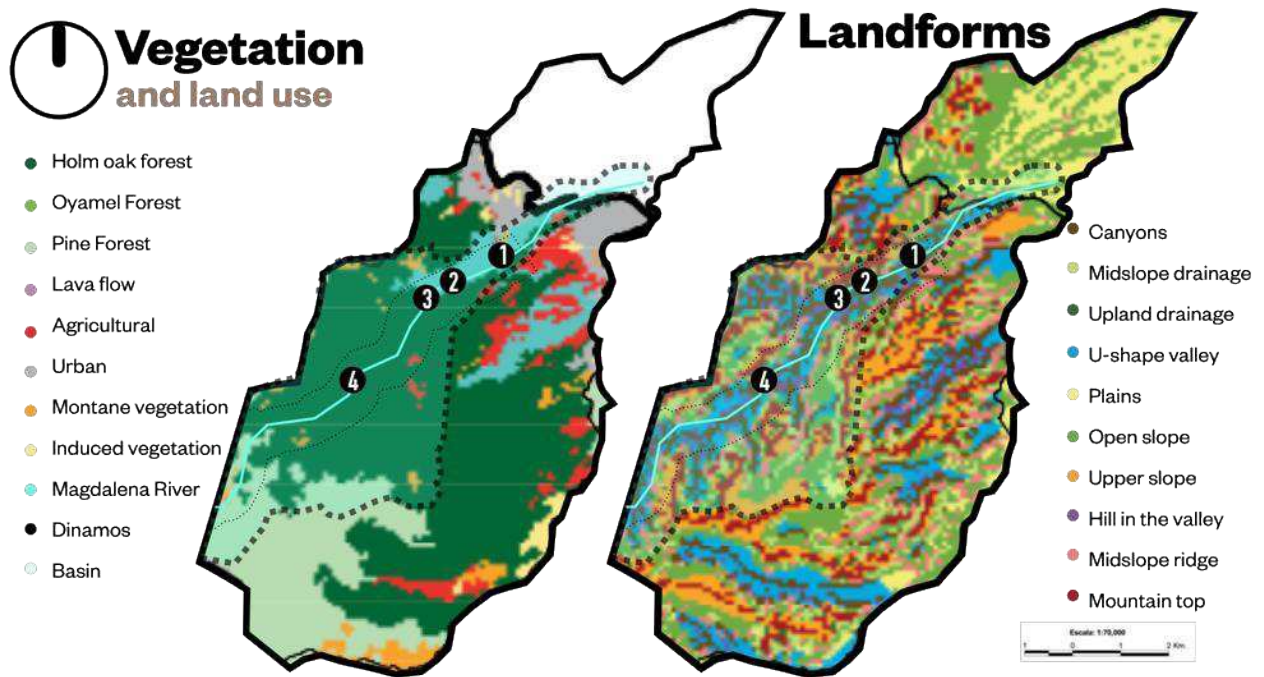


©Enrique Abe Takahashi  
Source: *Suelo De Conservación*, 2014.

Photos (Oyamel Forest, High Mountain scrubland, coniferous forest, pine-oak forest) by Abe Takahashi and Elisa Angeles (Pteridophytes).

Due to its topographic characteristics, the geforms of the territory are of all types, which allows the territory its ecosystem diversity. Predominant in the territory are canyons, drainage hills, U-shaped valleys, slopes and mountain tops.

Figure 7. Vegetation, land use and Landforms.



Elaborated by the author based on INEGI, Dirección General de Medio Ambiente y Ecología and Google Earth.

#### d. Biodiversity

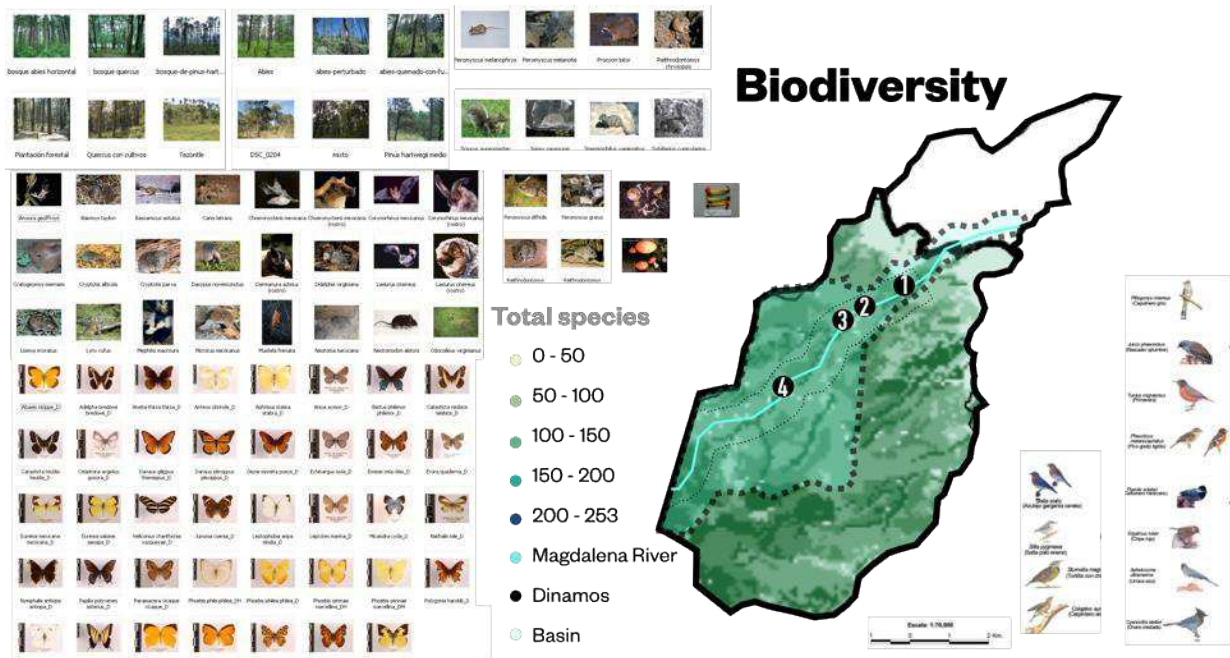
The biodiversity in the area due to the characteristics of the physical-natural environment, the study region contains a great diversity of both flora and fauna. The biophysical characteristics of the basin allow it to form an important refuge for biological richness, despite its proximity to the urban area. Thanks to studies such as the Magdalena River restoration plan, which included an evaluation of the area's biodiversity, we have recent data on the number and diversity of species. There are 780 species of plants, 111 species of algae, 194 species of vertebrates, and 74 species of fungi.<sup>51</sup>

There is a total of 41 species in risk categories is a warning about the need to establish ecosystem management guidelines.<sup>52</sup>

<sup>51</sup> Facultad de Ciencias, UNAM. "Censo De Biodiversidad Del Suelo De Conservación Contrerense Convenio." *Secretaría Del Medio Ambiente*, 3BC.

<sup>52</sup> Ibid

Figure 8. Biodiversity.



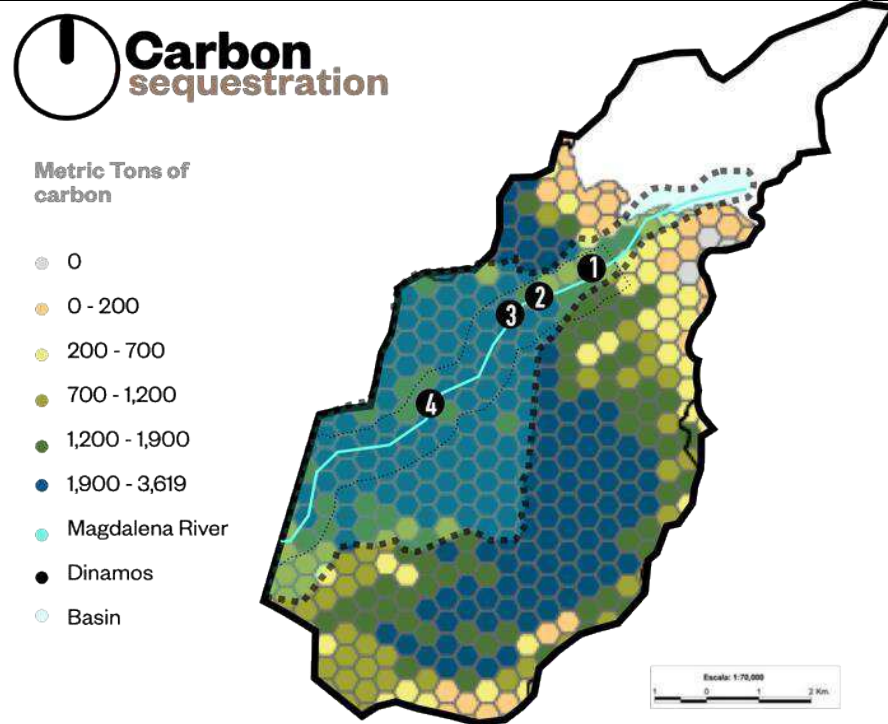
Own elaboration based on: Dirección de Ordenamiento Ecológico del Territorio y Manejo Ambiental del Agua, et al. *Suelo De Conservación*. 2014. And Facultad de Ciencias, UNAM, *Censo de Biodiversidad del Suelo de Conservación Contrerense*.

e. *Ecosistemical services*

A great part of importance of this territory lies in the environmental services it provides to the city, being a natural protected area, indispensable for maintaining the quality of life of those who live in Mexico City. Tangible and intangible ecosystem services are provided by the conservation land of which the study site is part and in a regional level contributes. Some of the services are water production, climate regulation, soil retention, carbon sequestration, biodiversity, agricultural production, scenic, recreational, and cultural beauty.

In a local level, the importance lies in the forestry, agricultural, livestock and tourism activities carried out in the area by the rural communities that own this territory, which is the basis for their economic and social development.

Figure 9. Carbon sequestration.

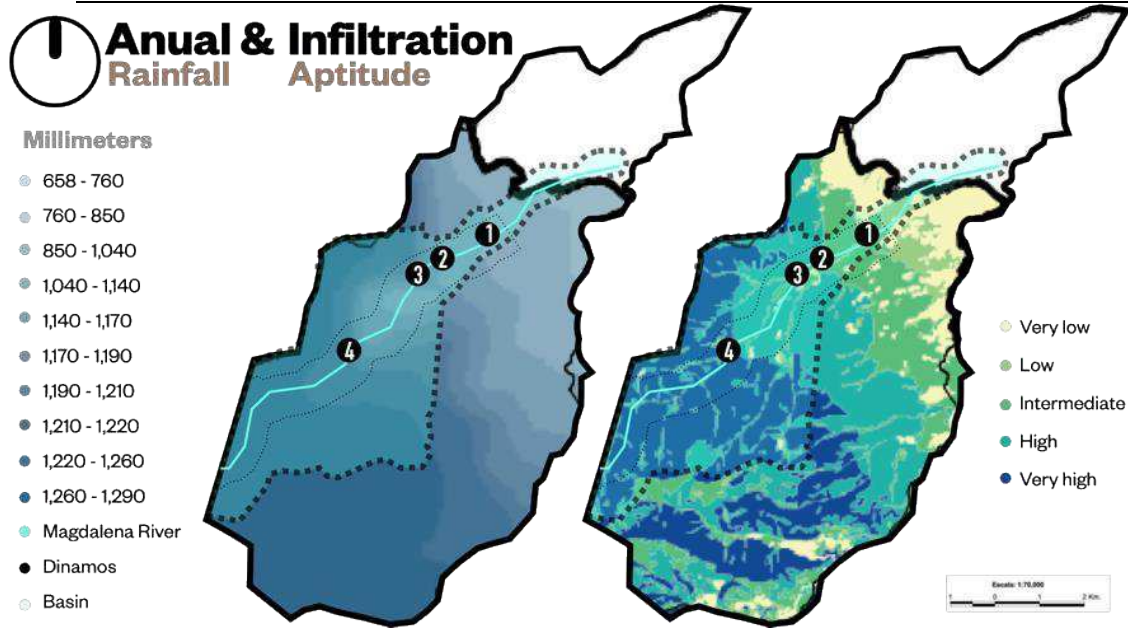


Elaborated by the author based on INEGI, Dirección General de Medio Ambiente y Ecología and Google Earth.

Carbon sequestration, among others ecosystem services mentioned before, is realized thanks to the existence of forests in conservation land, and due the canopy density in the forest of the parks and the presence of vegetation cover and recycling processes through litterfall and decomposition have additional carbon sequestration benefits, making the carbon sequestration in the area is among the highest, capturing between 1,900 to 3,619 metric tons of carbon in most of the river basin.



Figure 10. Annual rainfall and Infiltration aptitude of study.



Elaborated by the author based on INEGI, Dirección General de Medio Ambiente y Ecología and Google Earth.

The water flowing through the Magdalena River represents the most relevant source of surface water in Mexico City. It is considered to be the system in the best state of conservation and provides about 21 million cubic meters per year.<sup>53</sup>

In general terms, the average annual precipitation in the area ranges between 658 and 1,290 mm per year and because the basin has on average a high infiltration rate makes the study area one of the most important, since it concentrates a heavy load of annual rainfall and, due to the nature of the rocks is fundamental in the infiltration of rainwater (andesites and fractured basalts).<sup>54</sup>

It can be seen in the map above, that the southwestern part of the territory has a very high infiltration compared to the rest of the conservation land, finally allowing the recovery and recharge of Mexico City's aquifers.

<sup>53</sup>Lucia Almeida Leñero, et al. «Servicios Ecosistémicos En La Cuenca Del Río Magdalena, Distrito Federal, México». *Gaceta Ecológica*, no. 84, Jan. 2007.

<sup>54</sup> Ibid.

## II. The history of the site

An ancient history and appropriation of the site in terms of industry

The *Magdalena Contreras* territory first inhabitants were the *Chichimecas Nahuatlacas*, hunter-gatherers that habituated the mountains and highlands of the area. The region later was territory of the *Tepaneca* indigenous people, who were part of the territorial division of *Coyoacán*<sup>55</sup>, which was the head of all the mountain towns, and they had to pay a tribute to *Tenochtitlan*. Their economy consisted in the production of included lithic (elements made of stone), pottery, basketry, and feather-work<sup>56</sup>.

During the Tepanec period in the region the towns known as *Ocoteppec*, *Atlitic*, *Aculco* and *Totolapan* were founded, today known as the original towns of *San Bernabé Ocoteppec*, *San Jerónimo Aculco*, *San Nicolás Totolapan*, and *La Magdalena Atlitic*, the latter corresponding almost entirely to our study area. The importance of mentioning these towns lies in the strong identity they preserve, which has allowed them to maintain the category of towns despite the urban growth around them. From the fifteenth century, during the colonial period, the authorities granted codes and primordial titles to communities, that even nowadays continue to have weight to these original towns<sup>57</sup>.

Throughout the pre-Hispanic era, this ancient's inhabitants regarded the Magdalena River with a religious and ceremonial connotation, thus, dedicated to the deities of water<sup>58</sup>.

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<sup>55</sup> Acosta Colin, Silvia Laura, «Las tierras comunales de la Magdalena Contreras», thesis in geography, Universidad Nacional Autónoma de México, Facultad de Filosofía y Letras, Mexico, 2001.

<sup>56</sup> Abundis Jaime, « La huella carmelita en San Ángel», *Instituto Nacional de Antropología e Historia*, 2007, p. 271

<sup>57</sup> The primordial titles and codices were legal instruments for granting territorial possessions to both Indian peoples and communities in Mexico.

<sup>58</sup> De la Torre Yarza, Beatriz E. « Tláloc en la Cuenca del Río Magdalena». *Boletín del seminario "El emblema de Tláloc en Mesoamérica*. No9. Instituto de Investigaciones Estéticas (IIE), Universidad Nacional Autónoma de México, Mexico, 2013. p. 09-30.

**Figure 11.** Tláloc etched in the rock in the *Coconetla, Los Dinamos Park*.



Recovered November 2022, from: <https://www.mypacer.com/es/routes/128514/los-dinamos-4to-mirador-barranca-coconetla-dinamos-caminar-sendero-ciudad-de-m%C3%A9xico-m%C3%A9xico>

With the defeat of the Mexica around 1521 and the beginning of the viceroyalty of New Spain, the evangelization missions sent by orders of Charles I of Spain reached the lands south of the city. The religious orders that evangelized the area were the Franciscans and Dominicans, these last ones were the ones who founded in the town the church of Santa Maria Magdalena<sup>59</sup>, which explains why the town and its surroundings were named Magdalena de Atlitic, in the XVII century.

At that time, the water of the Magdalena River was mainly used for the agricultural irrigation near the original towns, water supply of the neighborhoods houses, farms and gardens and clergy properties and a proto industry<sup>60</sup>. Regarding the management and use of the river water, the legal framework of the colony allowed access to water as a public good, especially for domestic purposes and activities such as watering livestock or fishing<sup>61</sup>. The production of the area consisted of vegetation with medicinal use, corn, barley, flowers, and fruit, and pulque.

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<sup>59</sup> This name refers to Mary of Magdalene, a disciple of Jesus mentioned in the Gospels.

<sup>60</sup> Zamora Saenz I. Benedicto, «Dos modelos de gestión en la historia del río Magdalena, Ciudad de México. El repartimiento colonial y la Junta de Aguas», in *Cuicuilco* (Revue de sciences anthropologiques), México, vol. 25, n° 71, 2018, p. 111-138. Une proto-industrie est une petite unité de production manufacturière, présente notamment dans la Nouvelle-Espagne et plus tard au Mexique.

<sup>61</sup> Ibid, p. 111-138.

Finding advantageous the resources and the natural conditions of the region, in 1543 the first *batán*<sup>62</sup> was installed by Jerónimo de León, a Spanish merchant, which was powered by the energy generated by the Magdalena River.<sup>63</sup>

Around 1550, the Magdalena River basin had several fulling mills, where wool fabrics, shawls, hats, etc. were made<sup>64</sup>. *Batán de Posadas* in *San Angel*, *Batán de Sierra* (Puente de Sierra), *Batán de Anzaldo* (north of Puente de Sierra) and *Batán de Leon* (La Magdalena), the latter owned by Jerónimo de León who would later be bought by Tomás de Contreras.<sup>65</sup>

The rights of the property in the first half of the 17th century, passed to be property of Tomás de Contreras, who was the first businessman in *Magdalena Atlitic* to set up a blanket industry named “*Obraje*<sup>66</sup> *de Contreras*”, on the banks of the river and in the town of Magdalena, and this business had a strong impact on the economy of the area, that the town became known as *Magdalena Contreras*.<sup>67</sup> Its facilities gave rise to the spinning and weaving factory El Águila in the 19th century, whose French owners later acquired the Santa Teresa factory as well.

The haciendas<sup>68</sup> and ranches in the area were also established in colonial times and had a great boom in the 17th century. In Magdalena Atlitic and its surroundings, several haciendas and ranches were established, due to their strategic location on the outskirts of the capital and the great economic value of the productive lands. The most important, La Hacienda de la

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<sup>62</sup> Constructions designed for the pounding of fabrics, especially wool fabrics. In general, they are usually rather rustic buildings in which a wooden contraption employs two large mallets moved by the force of the water, which alternately strike the fabric. accessed March 2022 at [https://osbatans.gal/?page\\_id=20&lang=en](https://osbatans.gal/?page_id=20&lang=en)

<sup>63</sup> López Zayra, «Tragedia de los comunes, gobernanza y acción colectiva de los bienes de la comunidad agraria “La Magdalena Atlitic” » Thesis in political sciences, Universidad Nacional Autónoma de México, Facultad de Ciencias Políticas y Sociales p. 101.

<sup>64</sup> Alvarez Roman Karina, «Geografía de la educación ambiental: algunas propuestas de trabajo en el bosque de los dinamos, área de conservación ecológica de la Delegación Magdalena Contreras», Thesis in geography, Universidad Nacional Autónoma de México, Facultad de Filosofía y Letras, Colegio de Geografía, 2000. p. 41

<sup>65</sup> Ibid, p. 40.

<sup>66</sup> The *obrajes* were small industries that existed from the mid-sixteenth century. In the nineteenth century, most of the indigenous people made textile products.

<sup>67</sup> Abundis Jaime, « La huella carmelita en San Ángel », *Instituto Nacional de Antropología e Historia*, 2007, p. 702

<sup>68</sup> The *hacienda* was an agricultural property operated by a landowner who directed it and a workforce that was subordinate to him.

Cañada, founded in the XVIII century and that supplied on a smaller scale compared to the large haciendas such as the Eslava, it supplied the city with the articles that were produced.<sup>69</sup>

The introduction of new production methods changed the economy of the area and starting the use of land and river with *batánes* and *obrajes*, that were installed along the haciendas through the Magdalena River, thus constituting the outlines of the industrial landscape in the area.

### III. Conclusions of Chapter I

*Los Dinamos* is made up of four sections within the protected natural area *Zona Protectora Forestal del Río de la Magdalena* (Magdalena River Protected Forestal Zone), which in turn, has been given different names. *Los Dinamos* are also currently part of an ecotourism zone where several of the community members have taken charge of the "management" and "protection" of the park. The legal situation of the study area is complicated because the different territorial demarcations mean that there is no one clearly responsible for the park's management. This issue will be addressed in detail in chapter four.

Regarding the biophysical composition of the study area, we see that within the area of study there are a numerous type of ecosystem and diversity caucused due to the various geographic factors that occur in the field. For its characteristics, constitutes a vital area for Mexico City, not only because its natural richness but also because the population of this cosmopolitan city depends on environmental services provided by this land. Unfortunately, urban expansion and the real estate market have had over the years an impact on the legal boundaries, not defined by a physical barrier, and conservation lands are found with varying degrees of preservation.

Besides we must not forget the importance of the Magdalena River, as one of the last open-air rivers but also as an element that was key to the consolidation of development and social growth, as well as an important element in the ideological and theological spheres.

Historically, the Magdalena River has been a detonator of economic activities, initially agricultural and later industrial and factories that were built along its bank's margins. The river

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<sup>69</sup> Facultad de Arquitectura UNAM, « Reporte de investigación para el Diagnóstico sectorial de la cuenca del río Magdalena: Componente 12; Patrimonio histórico cultural », in *Plan Maestro de Manejo Integral y Aprovechamiento Sustentable de la Cuenca del Río Magdalena*, SMA-GDF, 2008.

constitutes the axis element of an industrial landscape conformed at this point (in the next chapter this subject will be addressed in detail during the 19th century) where the installation of these fulling mills set the foundations of the of the manufacturing facilities production in the region.

## **Chapitre II. La création du système électrique de la Rivière Magdalena et son évolution.**

### Résumé

La période que j'ai l'intention d'explorer dans ce chapitre s'étend des dernières décennies du 19ème siècle jusqu'au milieu du 20ème siècle.

La première partie "*Des Obrajes et Haciendas à l'industrialisation*" introduit le changement de la propriété, le développement des usines dans le contexte historique et social de la période initiale, en soulignant des aspects tels que les groupes d'entrepreneurs, la législation et en énumérant le groupe particulier d'hommes d'affaires français qui, dans leur vision des affaires, ont contribué à la modernisation et à l'industrialisation de la zone étudiée, en développant également le thème de l'énergie électrique et de l'industrie au Mexique.

Une deuxième partie aborde le système de la Rivière Magdalena, composée de ses usines, *Los Dinamos*, son histoire et sa construction, les concessions sur la Rivière Magdalena, le chemin de fer de Cuernavaca, et d'autres infrastructures.

Enfin, la troisième et dernière partie développera brièvement le déclin de l'essor de l'industrie dans la zone d'étude.

## Chapter II.

### The creation of the power system of the Magdalena River and its evolution.

The period of time that I plan to explore in this chapter covers the period from the last decades of the 19<sup>th</sup> century until the mid-20th century.

The first part “From the *Obrajes* and *Haciendas* to industrialization” introduces the change of the property, the developpe of factories in the historical and social context within the beginning period, highlighting aspects such as entrepreneurial groups, legislation and listing the particular group of French businessmen who in their vision of doing business helped the modernization and industrialization of the study area, also developing the topic of electric energy and industry in Mexico.

A second part addresses the Magdalena River system, composed of its factories, *Los Dinamos*, its history and construction, the concessions on the Magdalena River, the *Cuernavaca Railroad*, and other infrastructures.

Finally, the third and last part will briefly develop the decline of the development boom of the industry in the study area.

#### I. From the *Obrajes* and *Haciendas* to industrialization.

##### a. *The entrepreneurial groups, legislation, “barcelonetes” and the Factories.*

The creation of *Banco del Avío*<sup>70</sup> in October 1830 by Lucas Alemán, Minister of Foreign Affairs in the government of Anastasio Bustamante<sup>71</sup>, was the beginning of the industrial movement that had a great impact on the textile manufacturing centers in Mexico City, since it promoted the creation of companies that refinanced old mills and factories or built new manufacturing centers on the outskirts of the city. Proprietors of small factories, became capitalist partners and numerous foreign businessmen, including those of Anglo, French and

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<sup>70</sup> A financial institution with the objective of financing the modernization of the textile industry and promoting cotton production. The bank granted low-interest loans to textile entrepreneurs for the acquisition of machinery and raw materials. In this way, Banco de Avío contributed to the growth of the Mexican textile industry and the modernization of the country.

<sup>71</sup> President of Mexico during the period from 1839 to 1841.



Hispanic origin, changed their role from that of traders or specialized workers to that of investors.<sup>72</sup>

These men, defined by Mario Bolio as *businessmen-manufacturers*<sup>73</sup>, by rehabilitating manufacturing centers or creating new ones, were the precursors of the textile industry that extended and diversified in a first phase in our study area.

The *entrepreneurs-manufacturers*, using their capital obtained from other businesses, sustained, and increased the production of the factories. They introduced new machinery, supplied raw materials, and improved textile marketing margins.

Although the technological transformation of the factories took place with the creation of the Banco de Avío, the change during the *Porfiriato*<sup>74</sup> period is more significant, between 1876 and 1911.

The Porfirian legislation sought to strengthen national industry, granting benefits to businessmen, such as the free importation of machinery and construction materials without the payment of taxes and the possibility of expropriating the land required for the construction of the infrastructure necessary for industrial productive activity.

From 1868 to 1889, several tax exemptions were decreed for those industries, mainly favoring textile companies.<sup>75</sup>

With the law for the promotion of new industries issued in 1873, the import of machinery was guaranteed free of taxes and in 1884 the mining code modified the Constitution of 1857, modifying the ownership of the subsoil and promoting the system of concessions, both for mineral resources and water, attracting foreign investment.<sup>76</sup>

In return, the government obtained the inflow of funds from abroad for infrastructure works, from the creation or repair of roads, bridges and railroads, construction of bridges and

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<sup>72</sup> Arguello Manresa Gemma, review of Trujillo Bolio Mario, « Empresariado y manufactura textil en la Ciudad de México y su periferia. Siglo XIX ». Centro de Investigaciones y Estudios Superiores en Antropología social, México, 2000, in *Acta Sociológica*, 31, January-april, 2001, p. 267.

<sup>73</sup> Trujillo Bolio Mario, « Empresariado y manufactura textil en la Ciudad de México y su periferia. Siglo XIX ». Centro de Investigaciones y Estudios Superiores en Antropología social, México, 2000. p.122

<sup>74</sup> The *Porfiriato* is the historical period in Mexico that began in 1876, when General Porfirio Díaz came to power after a coup d'état, and ended in 1911, when the Mexican Revolution took place. During this time, important economic transformations and modernizations took place in the country, but there was also great social inequality and political repression.

<sup>75</sup> See more about in García Reynoso Plácido, « La Política mexicana de fomento Industrial », in *Comercio Exterior*, Banco Nacional de Comercio Exterior, S.A. Vol. XVIII, num. 11, Mexico, 1968, pp. 959-984.

<sup>76</sup> Parra Alma, « Los orígenes de la industria eléctrica en México. Las compañías británicas de electricidad (1900-1929) », in *Historias*, núm. 19, october-march, 1988, p. 140

neighborhoods, to the distribution of services, such as water and those derived from electricity.<sup>77</sup>

The areas of foreign investment with the greatest strength during the Porfiriato were railroads, financial activities, and mining. In this regard, Alma Parra writes the next extract:

“The North Americans invested mostly in mining and railroads since it guaranteed them direct extraction...thus, part of the French and German capital that arrived was brought by immigrants who were dedicated to the textile industry and the brewing industry respectively. The British, who had a long experience in Mexican mining companies, also played an important role in the railroads”.<sup>78</sup>

Under this context, in our study area, the Americans J. H. Hampson and Adolfo Grimwood<sup>79</sup> had a great influence for the development of the railroad, and for the development of the rest of the system, a group of foreigners from what today is the Alpes de Haute Provence, France, before the Barcelonnette valley, called in several studies as *Barcelonnettes*, who emigrated in large numbers to Mexico and who developed in the textile trade.<sup>80</sup>

The *Barcelonetes* group, were also owners and founders of businesses such as: *Las Fábricas de Francia*, *El puerto de Liverpool*, *La Ciudad de Londres*, *Las Fábricas Universales*, among others, which served as clothing and novelty stores in Mexico City between the years 1828-1900.<sup>81</sup>

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<sup>77</sup> Becerril Montero, José G., « El proceso de construcción de estaciones productoras de energía eléctrica. El caso de las fábricas Santa Teresa y La Hormiga, 1896-1907 », in *Boletín de monumentos históricos*, n°16, Instituto Nacional de Antropología e Historia, 2009, p. 02

<sup>78</sup> Parra Alma, « Los orígenes de la industria eléctrica en México. Las compañías británicas de electricidad (1900-1929) », in *Historias*, núm. 19, october-march, 1988, p. 141.

<sup>79</sup> López González Valentín, « El ferrocarril de Cuernavaca 1897-1997 », Gobierno del Estado de Morelos, Secretaría de Bienestar Social, Dirección General de Relaciones Pública, Instituto Estatal de Documentación, México, 1997, p. 6.

<sup>80</sup> Gamboa Ojeda Leticia, « Les entrepreneurs de barcelonnette au mexique : les particularités d'une chaîne d'immigrants en amérique (1840-1914) », *Entreprises et histoire*, 2009/1 (n° 54), p. 110.p. 110.

<sup>81</sup> *Ibidem*, p.120

Figure 12. Engraving of the textile effects warehouse *La Ciudad de Londres*.



Taken from: Trujillo Bolio Mario, *Empresariado y manufactura textil en la Ciudad de México y su periferia: siglo XIX*, CIESAS, 2000.

Figure 13. Engraving of the textile effects warehouse *Las Fábricas Universales*,



Taken from: Trujillo Bolio Mario, *Empresariado y manufactura textil en la Ciudad de México y su periferia: siglo XIX*, CIESAS, 2000.

Thanks to the enrichment of the Barcelonete community, and their good relations with other businessmen, politicians, and intermediaries between the private and public sectors, such as lawyers, notaries, and concessionaires, they expanded their business towards industry and its factories, their acquisition and renovation or the establishment of new ones. Their business had a perspective of vertical integration of their companies led them to be interested mainly in textiles, by manufacturing them and later in their stores and warehouses to put them on sale.

Leticia Gamboa mentions that in order to successfully enter the textile industry, they combined their stores to raise capital, those who installed new factories did so contemplating

a large infrastructure to take advantage of economies of scale. Therefore, they sought to increase efficiency, to achieve monopolistic profits they had companies that owned between one and more factories.<sup>82</sup>

Within this group of *Barcelonetes*, those companies that had businesses and factories in the study area are *S. Robert y Cía*, *Meyran*, *Donnadieu y Cía* and, *Industrial La Abeja, S.A.*, owners of the factories *La Hormiga*, *La Magdalena*, *Santa Teresa*, and *La Abeja*. It is important to highlight them among the other factories and companies in the study area because they are directly related to our object of study, *Los Dinamos*.

The mode of production and commercialization of this group is called by the anthropologist Mario Trujillo, *industrial entrepreneurship*<sup>83</sup> that, essentially, dedicated itself to profit from the business of manufacturing and selling wool and cotton fibers. To achieve this specialization within the industry, this type of entrepreneur required more than one establishment for the varied manufacture of textiles, fabrics, and clothing; he also counted on real estate and other activities to strengthen his company.

With their acquired factories, these entrepreneurs diversified the production of classes and types of textiles, investing in hydroelectric plants to supply the factories and sell the fluid to the inhabitants of the surrounding area.

In short, in textiles, the *Barcelonetes* followed a vertical integration strategy, supplying their fabric stores and the network of stores of their compatriots from the country's interior.

**Table 3. *Barcelonetes* in the large textile factories south of Mexico City,**

<b><i>Barcelonetes</i> and factories south of Mexico City</b>				
<b>Companies, year of foundation and dissolution</b>	<b>Main associates (companies and individuals)</b>	<b>Factories owned</b>	<b>Manufacturing</b>	<b>Location of factories</b>
S. Robert y Cía. Founded in 1889. Purchase of the factory in 1898. Previous owner	Sébastien Robert; Émile Meyran; Pierre A. Chaix; Santiago Arechederra, (at the same time associates of La Hormiga, S.A.)	La Hormiga 1843- 1890	Cotton spinning, weaving, and printing	Surroundings of Tizapán

<sup>82</sup> Ibidem, p.125

<sup>83</sup> Trujillo Bolio Mario, « El empresariado textil de la Ciudad de México y sus alrededores, 1880-1910», in *Modernidad, tradición y alteridad. La ciudad de México en el cambio de siglo (XIX-XX)* », Agostoni Claudia y Speckman Elisa (ed.), México, Universidad Nacional Autónoma de México, Instituto de Investigaciones Históricas, 2001, p. 38.

Nicolás de Teresa (Spanish)				
Meyran, Donnadiou y Cía., S. in C. Founded in 1891 Purchase of the factories from 1898 onwards. Previous owner Carlos Sánchez Navarro.	Louis Veyan ; Jean y Léon Meyran ; Antoine y Jacques Donnadiou ; Adrien, Camille Jean.	La Magdalena 1830-1967  Santa Teresa 1857 - 1909	Cotton spinning, weaving, and printing.  Paper, thread and fabrics.	Surroundings of Contreras  Surroundings of Contreras
Cía. Industrial La Abeja, S.A. Founded in 1894.	Jean Dachary y Firmin Balp; J. Olliver y Cía; A. Reynaud y Cía; Signoret, Honnorat y Cía; J-B. Ebrard y Cía; M. Bellon y Cía; S. Robert y Cía; F. Manuel y Cía; L. Faudon y Cía; D. Ollivier y Cía; Maurel Hermanos; F. Sanche y Cía; A. Génin; A. Casaubon; P. Richaud; E. Pinson; H. Andragnez; A. Kern; M.B. veuve Thomé; P. Lenze; V. Godard, y M. Rueff.	La Abeja (Former Batan de Sierra factory) 1843- 1890	Cotton spinning, weaving, and printing.	Surroundings of San Angel.

Own elaboration with information taken from: Gamboa Leticia, *Les entrepreneurs de barcelonnette au mexique: les particularités d'une chaîne d'immigrants en Amérique (1840-1914)*, and Becerril José, *El proceso de construcción de estaciones productoras de energía eléctrica. El caso de las fábricas Santa Teresa y La Hormiga, 1896-1907.*

*b. Energy and industry.*

With the rise of industry and in the midst of the second industrial revolution, which highlighted the use of electric power, it became an option to meet the demand for motive power.

Mexico, being a country seeking to raise its level of development, experimented with the transfer of electrical technology through the textile industry, being perhaps the first

hydroelectric plant installed in 1883 by the "*Fábrica de San Lorenzo*", a textile factory located in the outskirts of the city of Orizaba, in Veracruz.<sup>84</sup>

The Porfiriato having already laid the foundations of its institutional framework with the potential for exploitation and export, witnessed the adoption of technology and saw its effects reflected in economic growth.

As is a tendency in the configuration of the territory, the populations or manufacturing centers tended to settle near resources such as rivers, and the municipality of San Ángel and its production units were no exception. The use of the driving force driven by the Magdalena River in the haciendas and fulling mills, together with the first working class neighborhoods linked to these systems, allowed it to have a continuous labor force.

With the arrival of the energy producing machinery to the territory, with the help of the *Barcelonetes* and the institutional framework of the country, the textile industry in Tizapán and Contreras was able to establish hydroelectric plants both in its surroundings (as in the case of the *Fábrica El Águila*), and in the high lands where the Magdalena River came from, the forest of the Cañada or Contreras where the *Dinamos* would be found. These hydroelectric plants not only provided energy to the textile factories but also commercialized the sale of energy in the town of Contreras.<sup>85</sup>

Antonio Ibañez explains:

“*Motive power* was necessary for industrial processes, but it played the role of a complementary service...they required a direct link between the source of the motive power and the machinery, while the irruption of electric power at the end of the 19th century would allow new possibilities: due to the transformation of energy and its transmission to distant sites the producing facilities could be resolved as independent units from the consumption sites.”<sup>86</sup>

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<sup>84</sup> Ibañez González Luis Antonio, « Trazas y trazos de la infraestructura eléctrica porfiriana en la ciudad de Puebla », in *La electricidad y la transformación de la vida urbana y social*, Universidad de Evora, 2019, p.223

<sup>85</sup> Archivo Histórico de la Ciudad de México (AHCDMX), c. 6, Exp. 43, Colección. Municipalidades, ref. 8784.

<sup>86</sup> Ibañez González Luis Antonio, « Trazas y trazos de la infraestructura eléctrica porfiriana en la ciudad de Puebla », in *La electricidad y la transformación de la vida urbana y social*, Universidad de Evora, 2019, p.223  
Own translation. Original text: [La fuerza motriz era necesaria para los procesos industriales pero jugaba un papel de un servicio complementario... requerían de un vínculo directo entre la fuente de la fuerza motriz y la maquinaria, mientras que la irrupción de la energía eléctrica a finales del siglo XIX permitiría nuevas posibilidades: debido a la transformación de la energía y su transmisión a sitios distantes se podrían resolver las instalaciones productoras como unidades independientes de los sitios de consumo.]

## II. The Magdalena River system.

### a. *The factories of the Magdalena River.*

During the course of the 19th century, six factories<sup>87</sup> were established in the study area, as shown in Figure 14, which were distributed among the towns south of Mexico City. *Contreras* in the westernmost part, *San Jerónimo*, *Tizapán* and *San Ángel* closer to the center of the city. Around 1836 two of these were located in the town of *Contreras*, *La Magdalena*, re-established in the old *obraje*, working cotton for the production of blankets, and *El Águila*, which was dedicated to wool fabrics.

In 1843 two spinning mills were established, *La Hormiga* in *Tizapán*, which produced cotton blankets, and *Batáncito de Sierra* latter also known as *La Abeja*, which produced T-shirts. Seven years later, in 1850, *Santa Teresa* was established in the neighborhood of the same name, and at the end of the 19th century it changed its production from paper to wool textiles. The factory *La Alpina*, appeared at the beginning of the 20th century working wool fabrics. Of these factories, a total of four were acquired by the French *Barcelonetes*, *La Hormiga*, *La Magdalena*, *La fábrica Santa Teresa* and *La Abeja (Puente de Sierra)*.

In addition, there were also the paper mills of *Loreto*, in *Tizapán* operating since 1825 and *Peña Pobre*<sup>88</sup>, in *Tlalpan*, the latter outside the study area but part of this industrial system.<sup>89</sup>

The factories not only settled in the area because of the Magdalena River, but also because of the climate, the forests, and the labor force, being a large part of the population of this area day laborers of the factories, haciendas, or ranches, who adapted to the form of factory production. The factories in turn led to the establishment of neighborhoods and colonies such as *Barrio de Loreto*, *La Otra Banda*, *Barrio Calles*, *Barrio de Santa Teresa*, *Barrio Sierra*, *La Concepción*, *Guadalupe*, *Santa Teresa* and *Padierna*.<sup>90</sup> Some of these neighborhoods had churches, chapels, farmland, warehouses, grocery stores and wine shops.

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<sup>87</sup> See annexes 2 to 7, where iconographic material about these factories can be seen.

<sup>88</sup> The *Loreto* and *Peña Pobre* paper mills were unified under the name *Loreto y Peña Pobre* in 1929. Together they served as a single paper mill until their closure in 1992.

<sup>89</sup> Camarena Ocampo Mario, *Jornaleros, Tejedores y Obreros. Historia social de los trabajadores textiles de San Ángel (1850-1930)*, Plaza y Valdes, México, 2001, p.32.

<sup>90</sup> See more in Alvarez Roman Karina, «Geografía de la educación ambiental: algunas propuestas de trabajo en el bosque de los dinamos, área de conservación ecológica de la Delegación Magdalena Contreras», Thesis in geography, Universidad Nacional Autónoma de México, Facultad de Filosofía y Letras, Colegio de Geografía,

Francisco Fernández narrates in a brief section of his book *Apuntes para la Historia de San Angel*:

“The inhabitants of the municipality, for the most part, are dedicated in the northern part to agriculture, floriculture...to the raising of poultry. In the mountainous part, to the cutting of wood for the elaboration of coal; in the pedregal, to the breeding of goats, and in the manufacturing centers of Tizapán and Contreras, to the factories.”<sup>91</sup>

Regarding the work force of these factories, Mario Camarena<sup>92</sup> explains that the textile factories were nourished by peasant migration from the outlying areas and the states surrounding the capital, and were made up of peasants, artisans, spinners, weavers, and laborers who constantly worked between one factory and another in search of a better salary.

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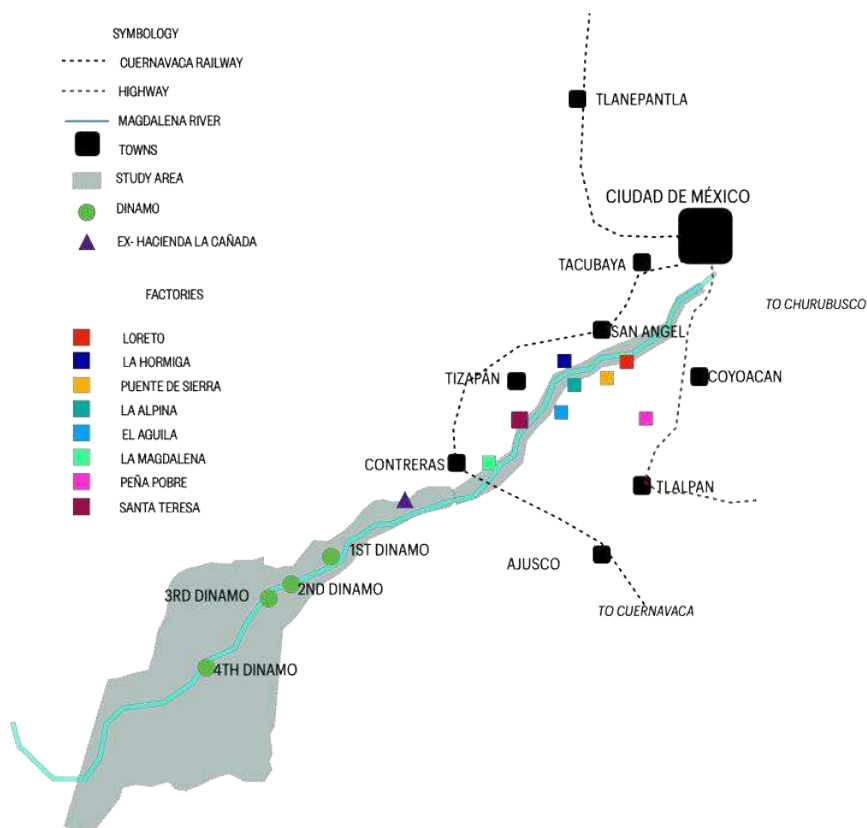
2000. p. 41 and Trujillo Bolio, Mario. «*Empresariado y manufactura textil en la Ciudad de México y su periferia. Siglo XIX*», Centro de Investigaciones y Estudios Superiores en Antropología social, México, 2000; and Cabrera Castillo Monserrat, «*Las familias obreras en momentos de crisis: la huelga de la fábrica textil La Magdalena, 1967-1971*», Thesis in history, Universidad Nacional Autónoma de México, Facultad de Filología y Letras, 2013

<sup>91</sup> Fernández del Castillo, Francisco, *Apuntes Para La Historia De San Ángel (San Jacinto Tenanitla) Y Sus Alrededores*, Impr. del Museo Nacional de Arqueología, Historia y Etnología, México, 1913, p.240 Own translation. Original text: [Los habitantes del municipio, en su mayoría, se dedican en el norte a la agricultura, floricultura... a la crianza de aves de corral. En la parte serrana, al corte de madera para la elaboración de carbón; en el pedregal, a la cría de cabras, y en los centros manufactureros de Tizapán y Contreras, a las fábricas.]

<sup>92</sup> Camarena Mario. «Disciplina E Indisciplina: Los Obreros Textiles Del Valle De México En Los años Veinte». *Historias*, n.º 7, 1984, p. 5



**Figure 14. Emplacement of the factories.**



Own elaboration, from: Trujillo Bolio Mario, *Protesta y resistencia de los trabajadores textiles en el Valle de México y su relación con los circuitos comerciales mexicano-estadounidenses (1865-1868)*.

*b. Los Dinamos.*

The factories that took on the role of industrial promoters in the southern area of Mexico City at the end of the 19th century and among their owners were companies such as those mentioned above related to the construction of *Los Dinamos*, hydroelectric power plants that would provide energy to the textile factories using the natural force of the Magdalena River with a flow that fluctuated between 400 and 200 liters per second, the first in the rainy season and the second in the dry season.<sup>93</sup> This flow enabled the creation of energy.

<sup>93</sup> Zamora Saenz I. Benedicto, «Dos modelos de gestión en la historia del río Magdalena, Ciudad de México. El repartimiento colonial y la Junta de Aguas», in *Cuicuilco* (Revue de sciences anthropologiques), México, vol. 25, n° 71, 2018.

In a period of growth for industries, as it was at that time, this type of development was of special interest to both the government and businessmen, so the concession was obtained for the start-up of the project.

Thus, on January 20, 1897, the concession was granted by President Porfirio Díaz to *Ángel Sánchez y Compañía*. In the brochure “*Efemérides Históricas de la Magdalena Contreras*” by the chronicler Melesio García, mentions that Ángel Sánchez, a native from Contreras, “passed the concession to a group of Frenchmen and thus was born the company Ángel Sánchez y Cía. which created or gave origin to the manufacturing region of San Ángel.”<sup>94</sup>

It is also mentioned in a text written by Mario Camarena and Mario Trujillo that in 1905 *La Magdalena, Santa Teresa* and *La Abeja* factories had their own power plant located in *Los Dínamos*.<sup>95</sup>

We know from the record of the concession in question, that this group of Frenchmen was none other than the *Barcelonetes* since the record mentions that it is granted to Angel Sanchez in “in attention to Mr. S. Robert and company concessionaires of part of the rights relating to the contract.”<sup>96</sup> Recalling that by *S. Robert and company* they refer to the company where Sébastien Robert is listed as a partner and therefore directly related to the factories *La Hormiga* and *La Abeja* (also known as *Puente de Sierra*).

After the granting of rights in 1897, José Becerril mentions that the construction of the plants took place between 1904 and 1907<sup>97</sup> and there is evidence of an official letter dating from 1906, date on which the works should be under construction, where the Secretary of Development requests from S. Robert y Cía, the purchase invoices and documentation related to the acquired material imported by the customs of Veracruz, “four copies of imported material...acquired in the American company, Westinghouse Electric & Manufacturing Company.”<sup>98</sup>

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<sup>94</sup> García García Melesio M., « *Éfemerides Históricas de la Magdalena Contreras, D.F.* ». n/a, [Brochure] available on the website: [https://drive.google.com/file/d/1pE4Z6nuFWYzKEuxyMr5-6Yt\\_UHT-ggIy/edit](https://drive.google.com/file/d/1pE4Z6nuFWYzKEuxyMr5-6Yt_UHT-ggIy/edit) recovered: February 2023.

<sup>95</sup> Camarena Ocampo, Mario y Trujillo Bolio, Mario, « *Empresarios, comerciantes, hacendados y fraccionadores: los industriales textiles de 1850 a 1940* » in Trujillo Bolio Mario, et al. « *Formación Empresarial, Fomento Industrial Y Compañías Agrícolas En El México Del Siglo XIX*», CIESAS, 2003, p. 203.

<sup>96</sup> See Annex 8, where there are photographs of this secession of rights.

<sup>97</sup> Becerril Montero, José G., « *El proceso de construcción de estaciones productoras de energía eléctrica. El caso de las fábricas Santa Teresa y La Hormiga, 1896-1907* », in *Boletín de monumentos históricos*, n°16, Instituto Nacional de Antropología e Historia, 2009, p. 22

<sup>98</sup> Archivo Histórico del Agua (AHA), Box. 33, Exp. 417, Fund. Aguas Nacionales.

These hydroelectric installations, known as *Los Dinamos*, were a prodigy of engineering that today give identity to the site where its vestiges are located. The engineer in charge was none other than Miguel Ángel de Quevedo y Zubieta, whose work is an example of the important role played by engineers in the development of infrastructure and urban planning in Mexico during the Porfiriato and post-revolutionary periods.<sup>99</sup>

Quevedo mentions how he established the *four Dinamos*, alongside a team of indigenous directed by Estanislao Gamboa, the project commissioned by the French Industrial Companies of the Contreras Spinning and Weaving Factories, which he directed in collaboration with Alberto and Arturo Pani.<sup>100</sup> He was also proud of the national labor force when he mentioned the construction of the ditches for the water canals.<sup>101</sup>

Casals y Ribera<sup>102</sup> theorize that Quevedo may have been chosen to be in charge of this work thanks to the connections he established with the Barcelonete group in other works such as the *Buen Tono* or *San Ildefonso*, works he carried out for the French businessman Ernesto Pugibet, both factories, the first, a cigar factory, and the second, a textile factory that later on turned to the execution of works for the San Ildefonso hydroelectric plant.

The hydroelectric power plants as its name suggests is a facility that produces electricity by harnessing the potential energy of water, in the case of *Los Dinamos*, through the creation of such energy by means of height games and falls, some hovering between 300 meters high,<sup>103</sup> and in Becerril's<sup>104</sup> description, he speaks of falls between 325 and 138 meters, to the building that is called the “engine room” where the electricity is generated.

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<sup>99</sup> Graduated as a hydraulic engineer from the *École National de Ponts et Chaussées* in 1887, Paris, his professional career ranged from the construction of large hydraulic infrastructures to the promotion of public policies to improve the quality of life of citizens. Among his most outstanding projects was the construction of the *Gran Canal del Desagüe* in Mexico City, a work that had enormous importance in the urban development of the Mexican capital and that allowed the control of the floods that affected the city.

<sup>100</sup> Alberto Pani and Arturo Pani were prominent Mexican architects who left their mark on architecture and urban planning in Mexico during the first half of the 20th century. Alberto Pani, who graduated from the National School of Fine Arts in 1901, was one of the founders of the Society of Mexican Architects and worked on emblematic projects such as the Secretariat of Public Education building and the Monument to the Revolution. Arturo Pani, Alberto's son, was known for fusing modern and traditional elements in his architecture and interior design, working on projects such as the Hotel María Isabel and the Insignia Tower.

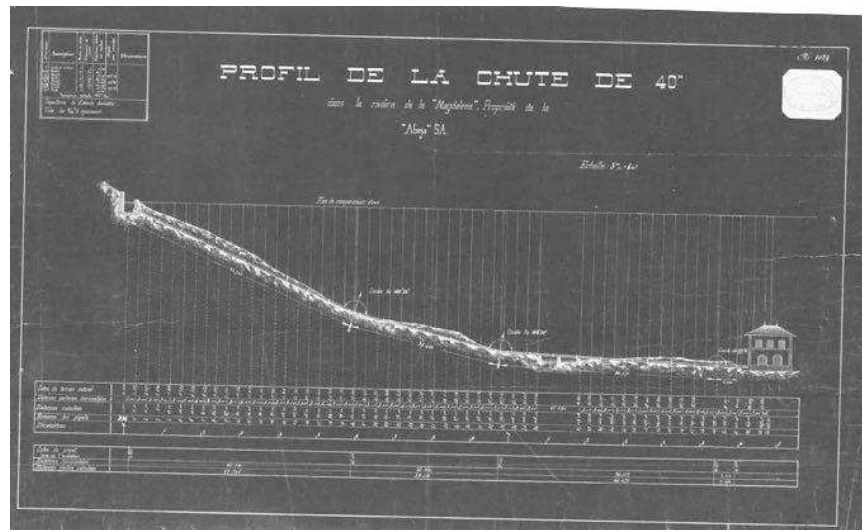
<sup>101</sup> Quevedo Miguel Á. de., *Relato de mi vida. México*, 1943, p. 31

<sup>102</sup> Casals Vicente and Ribera Eulalia, « *La energía hidroeléctrica en los escritos del ingeniero Miguel Ángel de Quevedo. Una revisión crítica* », in III Simposio Internacional de Historia de la electrificación, Mexico, 2015.

<sup>103</sup> Quevedo, Miguel Á. de., « El porvenir del carbón blanco en la República Mexicana. », in the *Boletín de la Sociedad Mexicana de Geografía y Estadística*, 1920, vol. IX, n°2, t. IX, p. 336

<sup>104</sup> Becerril Montero, José G., « El proceso de construcción de estaciones productoras de energía eléctrica. El caso de las fábricas Santa Teresa y La Hormiga, 1896-1907 », in *Boletín de monumentos históricos*, n°16, Instituto Nacional de Antropología e Historia, 2009, p. 25

**Figure 15. Profile of the 40" waterfall.**



In the river of the "Magdalena" property of the "Abeja" S.A. 2<sup>nd</sup> Dinamo Source: Mapoteca Orozco y Berra.

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**Figure 16. 5th photograph of the report on the works of Engineer Abel Nava that he rendered to the Ministry of Public Works. June-1907.**

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The photograph shows the 4th *Dinamo* also known as the Xonancocotla Plant. Source: AHA, Box. 571, Exp. 8315, Fund. Aprovechamientos Superficiales.

The key components of this way of generating electricity are the hydraulic turbines, the generator, the transformers and the gates and valves.

The construction of *Los Dinamos* began with the construction of canals to supply water to the turbines of the power plant. The canals take advantage of the springs of the *Magdalena* River, like *Cieneguillas*, *De las Cuevas*, *Coasoyac*, *El Campanario* and *Los Barbechos* springs,

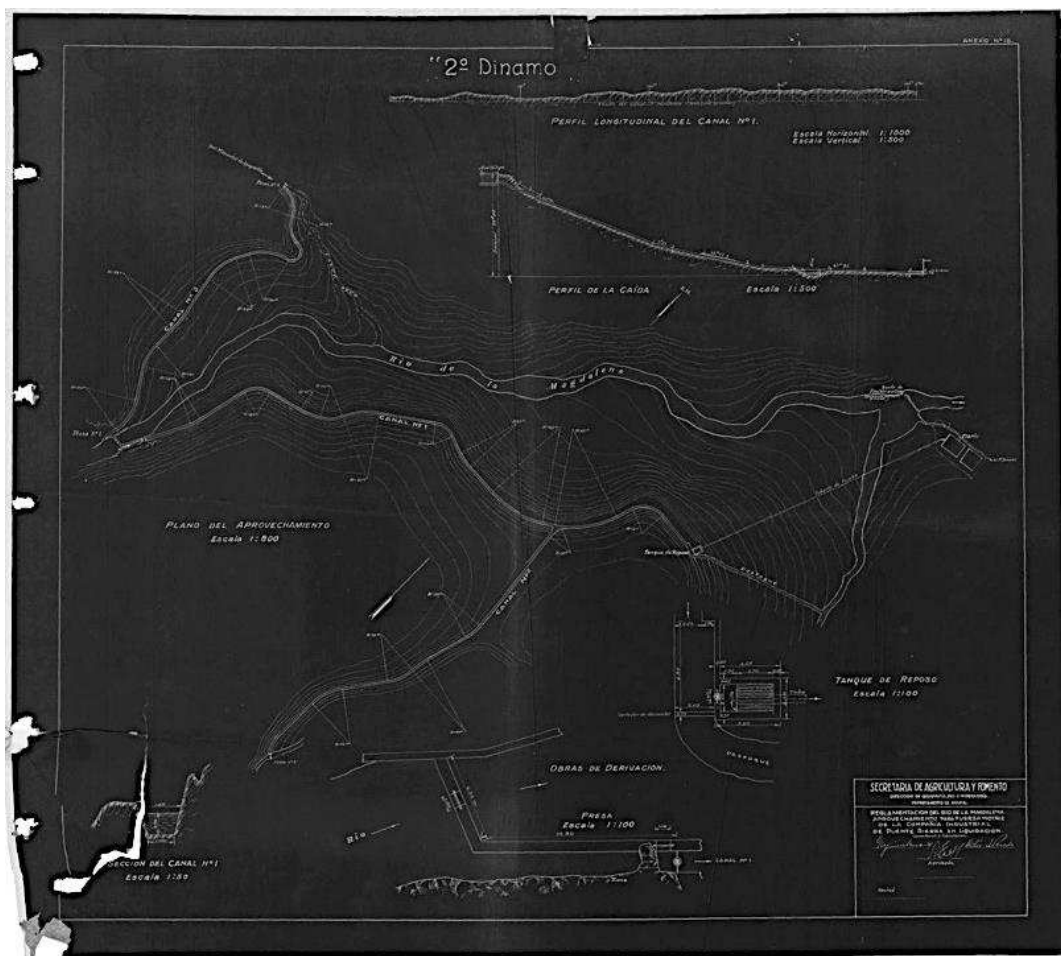
in a winding course and these canals within the study area are approximately 10 km long and some, as we will see later, are diverted to communities such as San Nicolás Totolapan or San Jerónimo.

**Figure 17. 4th photograph of the report on the works of Engineer Abel Nava that he rendered to the Ministry of Public Works. June-1907.**



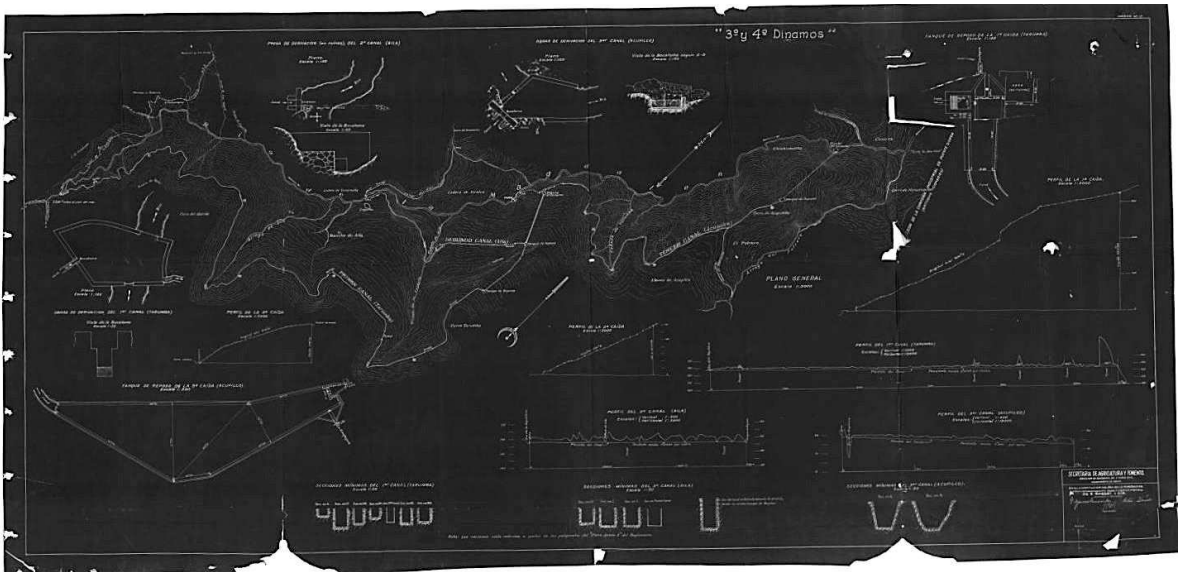
The photograph shows the construction of the canals to supply water to the turbines of the 4th *Dinamo* power plant. Source: AHA, Box. 571, Exp. 8315, Fund. Aprovechamientos Superficiales.

**Figure 18. Plan showing the derivation channels of the 2<sup>nd</sup> *Dinamo*.**



Showing the location of the fall and its longitudinal profile. Source: Mapoteca Orozco y Berra.

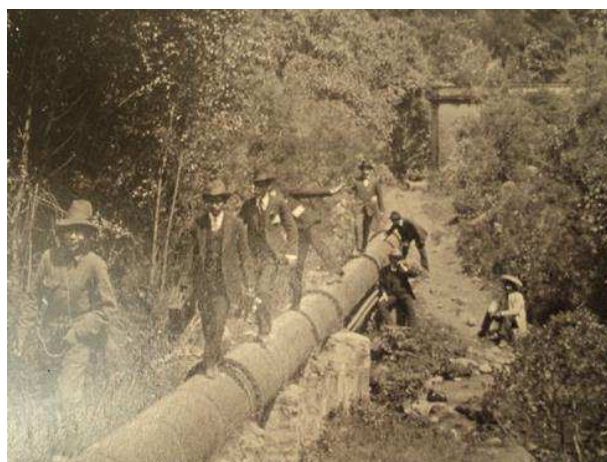
**Figure 19.** Plan showing the derivation channels of the 4<sup>th</sup> and 3<sup>rd</sup> Dinamo.



Showing the canals, location of the fall and its longitudinal profile. Source: Mapoteca Orozco y Berra.

The canals are diverted to dams and reservoirs, and conducted between canals, gates, and pipelines to the different *Dinamos*. The piping system appears to be of buried iron pipe<sup>105</sup>, to facilitate the supply of water, with 45 degree slopes. To accomplish this, dams and reservoirs were built to store water in various areas of the system, which was then released through the gates to generate power in the turbines.

**Figure 20.** Photograph showing the piping system of the 1<sup>st</sup> *Dinamo* and a group walking on it.

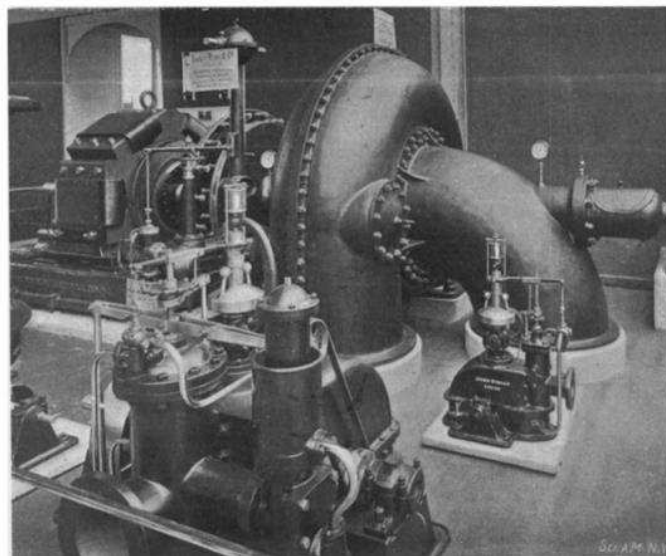


<sup>105</sup> Buried piping system refers to a water or fluid distribution system that uses pipes buried underground to transport the liquid from one place to another.

Source: Estación Contreras Museum.

Turbines, which convert the kinetic energy of water into mechanical energy, can be of different types. In this case, it is known that the turbines used at *Los Dinamos* for the flow level were of the Pelton type, which, like the Francis and Kaplan turbines, were designed to operate under different conditions, such as high or low water flow rates. In some *Dinamos* these turbines would be of the Swiss brand Piccard-Pictet and in the second *Dinamo*, the only one of the four that preserves machinery, it can be seen that the turbine is of the Swiss brand Escher & Wyss.

**Figure 21. Direct connected Turbines of Escher, Wyss & Company, of Zurich.**



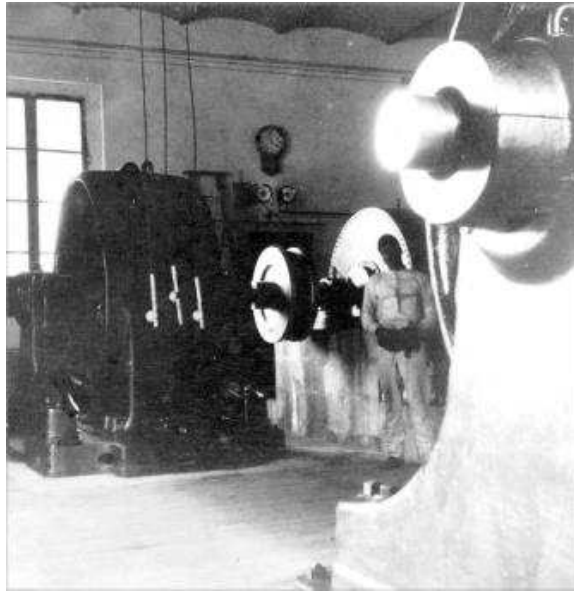
In this picture it can be seen a hydraulic turbine, the generator, its gates, and valves of an Escher & Wyss model, similar to the one preserved in the 2<sup>nd</sup> *Dinamo*. Source: Perkins, Frank C. (1900). Swiss Turbines. <https://doi.org/10.1038/scientificamerican11241900-324>

In the case of electric generators, which convert the mechanical energy generated by the turbines into electrical energy, and as mentioned above, those of the Westinghouse company were used, which had a three-phase coupling with a power of between 250 and 375 kilowatts depending on the machine and with potentials between 6 and 125 volts and an amplitude of 24 to 30 amperes.<sup>106</sup> And in the second *Dinamo*, there are still vestiges of what were once transformers, used to increase the voltage of the electrical energy generated by the generator to levels that are suitable for the transmission and distribution of electrical energy through the electrical network.

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<sup>106</sup> Description taken from Becerril, 2009, p. 27.

**Figure 22. The engine room.**



Probably the 4th Dinamo, it can be appreciated in the photograph the vaulted ceiling (still preserved in the 2nd Dinamo), also, the turbines, generators, and energy transformers. from: AHA, Box. 4288, Exp. 57263, Fund. Aprovechamientos Superficiales.

About the *first Dinamo*, Soberón Mora<sup>107</sup> describes that part of the machinery entered through Tampico Customs in October 1907 and consisted basically of an electric alternator with a capacity of 600 kW, among other components, such as 2,400 meters of piping.

It seems that at the end, the facilities passed from being property of Sebastián Robert to the Mexicana Light & Power Company,<sup>108</sup> Canadian company in Mexico, a company that was later bought by the Mexican government when the process of nationalization of the electricity industry began.

It is possible that due to the amount of production of these small hydroelectric plants was not much in comparison with works of the magnitude and importance of the Necaxa hydroelectric plant, which began to provide energy in 1905, that these facilities became obsolete in comparison.

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<sup>107</sup> Description taken from: Soberón Mora Arturo, « Cristal Bruñido: Río de la Magdalena », in *Dimensión Antropológica*, Año 22, vol. 64, may- august, 2015.

<sup>108</sup> Archivo Histórico de la CDMX, c. 6, Exp. 23, Colección. Municipalidades, ref. 8744.



c. *The concessions on the Magdalena River.*

As mentioned in the previous sections, the use of the waters of the Magdalena River as driving force and hydroelectric power throughout the 19th century was carried out within the industrial complexes established on the banks of the river.

Thanks to Figure 23 and Table 4 describes the system from its source to the incorporation of the Magdalena River into the Churubusco River.

**Table 4. Exploitation of the Magdalena River. Own elaboration from Reglamentación del Río Magdalena, esquema de aprovechamientos.**

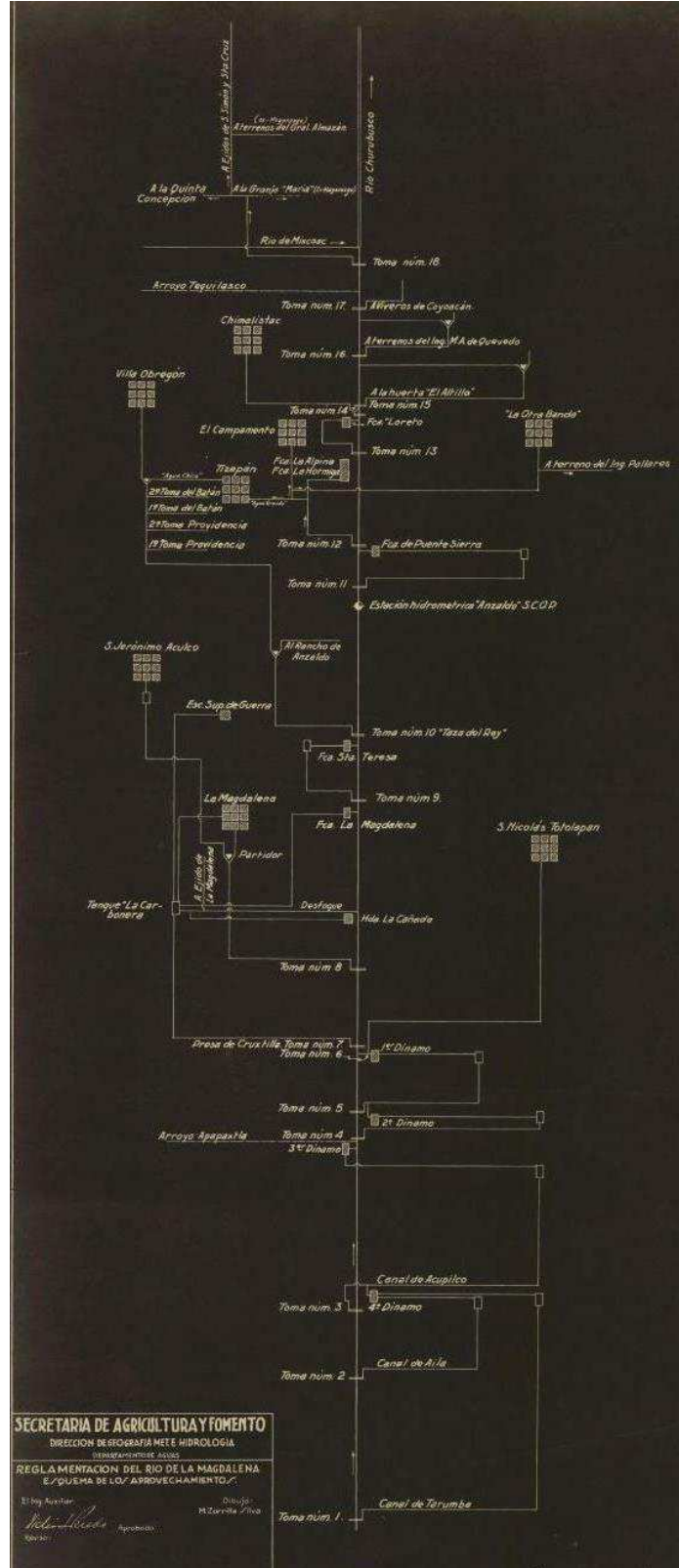
Water intake	Dinamo	Owner	Description
1	4 <sup>th</sup>	Ángel Díaz & Cía S. Robert & Cía	Water intake through the <i>Tarumba</i> canal to a small diversion dam to the 4 <sup>th</sup> <i>Dinamo</i> .
2			It collects water through the <i>Aila</i> canal to a collection dam, to be piped and used in the 4 <sup>th</sup> <i>Dinamo</i> .
3	3 <sup>rd</sup>	<i>La Hormiga</i> factory	It has its starting point at the 4 <sup>th</sup> <i>Dinamo</i> , right next to the place where the water is returned, and is conducted through the <i>Acupilco</i> canal, from where the pipeline that leads to the 3 <sup>rd</sup> <i>Dinamo</i> starts.
4	2 <sup>nd</sup>	Mr. F. Balp Sres. Ángel Sánchez & Cía <i>La Abeja</i> or <i>Puente de Sierra</i> factory	The water is used from the 3 <sup>rd</sup> <i>Dinamo</i> to a dam from an open channel on the right bank, where it is piped to come to work on the turbines of the <i>La Abeja</i> plant, the 2 <sup>nd</sup> <i>Dinamo</i> .
5	1 <sup>st</sup>	Meyrand, Donnadiou & Cía <i>Santa Teresa</i> factory	This intake uses water from the river and from the 2 <sup>nd</sup> <i>Dinamo</i> , which is conveyed through a channel on the right bank to a dam where it is piped for use in the movement of the turbines of the 1 <sup>st</sup> <i>Dinamo</i> .
6	-	San Nicolás town and Hacienda de Slava	The sixth intake, part of the village of San Nicolás
7		Contreras and San Jerónimo towns.	The seventh intake is from the <i>Cruxtila</i> dam to the "Carbonera" tank which joins the eighth intake and provides water to the ejido of La Magdalena, the town of Contreras, the hacienda of La Cañada, the factory of La Magdalena and <i>El Águila</i> and returns to the Magdalena River, which also provides water to the town of San Jeronimo.
8		Meyrand, Donnadiou & Cía. <i>La Magdalena</i> factory <i>El Águila</i> factory	

<b>9</b>		Meyrand, Donnadiou & Cía.  <i>Santa Teresa</i> factory	This intake belongs to the <i>Santa Teresa</i> factory.
<b>10</b>		-	Intake called " <i>Taza del Rey</i> ." That diverts to the left margin and supplies the <i>Rancho de Anzaldo</i> , the intakes of the first and second fulling mill, the intakes of Providencia, Villa de Obregón, <i>El Campamento</i> and the town of Tizapán. It is at this point that there are also intakes to the <i>Alpina</i> and <i>La Hormiga</i> factories.
<b>11</b>	-	Mr. Fermín Balp	The intake eleven leaves towards a dam after the hydrometric station " <i>Anzaldo</i> " at the <i>Puente de Sierra</i> or <i>La Abeja</i> factory.
<b>12</b>		S. Robert & Cía.	The twelfth intake pertains to the <i>La Hormiga</i> and <i>Alpina</i> factories.
<b>13</b>		Mr. H. Lenz	The thirteenth intake belongs to the <i>Loreto</i> Factory.
<b>14</b>		Chimalistac Town	Intake for the town of Chimalistac.
<b>15</b>		-	Intake to Huerta el Altillo
<b>16</b>		-	Intake directed to the land of Miguel Angel de Quevedo, the <i>Viveros de Coyoacán</i> .
<b>17</b>		-	Obraje of <i>Panzacola</i>
<b>18</b>		-	Towards <i>Quinta la Concepción</i> , ejidos of San Simon and Santa Cruz
It continues towards Río Churubusco.			

From: Mapoteca Orozco y Berra, and using the description Soberón Mora, Arturo, « Cristal Bruñido: Río de la Magdalena », in *Dimensión Antropológica*, Año 22, vol. 64, may- august, 2015.

Some independent hydroelectric production units would also be built in this corridor, marked in the diagram with a box filled in white. In this way it is possible to identify in the region the manufacturing centers, canals, and diversions to dams or reservoirs (in the diagram in empty rectangles), hydroelectric plants, haciendas, towns, neighborhoods, and ranches that make up the Magdalena River system.

Figure 23. Regulation of the Magdalena River, development diagram.



Source: Mapoteca Orozco y Berra.

Other elements that intervene in the Magdalena River system and that are not really appreciated in the scheme, but that I mentioned before, are the houses that housed the factory workers, who constituted a great part of the population of these towns. Neighborhoods such as Las Calles (fig. 24), Santa Teresa, La Magdalena or Loreto, had their buildings next to the factories, small houses of humble dimensions and interiors but with services, as can be seen in the image below, electricity and lighting. Some of these neighborhoods were also a shelter for the first syndicates.

**Figure 24. *Las Calles* neighborhood. Located in Contreras.**



**Source:** Magdalena Contreras Historia e Imagen, Photo shared by Edmundo López Romero.

#### *d. The Cuernavaca Railroad and other infrastructures*

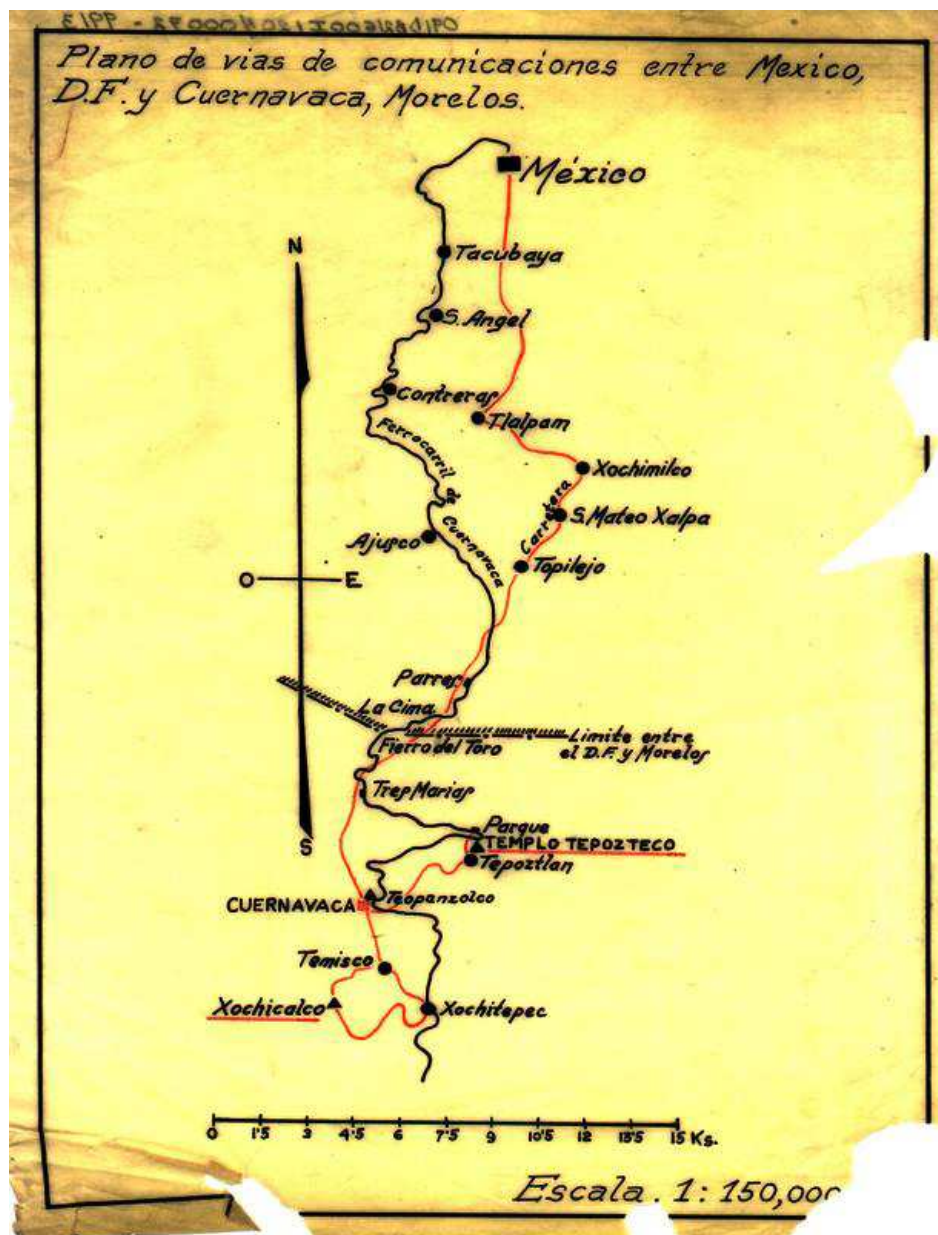
The Mexico-Cuernavaca Railroad was a rail line that connected Mexico City with Cuernavaca, the capital of the state of Morelos. It was one of the first railroads built in Mexico and its construction crossed mountainous and rugged regions between the two destinations. The construction of the railroad began in 1872<sup>109</sup> and in July 1893 the newspaper "The Mexican Financier" published a report on its construction<sup>110</sup> "the railroad reached Contreras, 30 kilometers from Mexico City".

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<sup>109</sup> López Gónzales Valentín, « El ferrocarril de Cuernavaca 1897-1997 », Gobierno del Estado de Morelos, Secretaría de Bienestar Social, Dirección General de Relaciones Pública, Instituto Estatal de Documentación, México, 1997.p. 6

<sup>110</sup> Hemeroteca Universidad Autónoma de Nuevo León, Fondo: Historia, Identificador: 2006252, Periodico The Mexican Financier, El Financiero Mexicano, 1893, Vol 22, No 17, July 15.

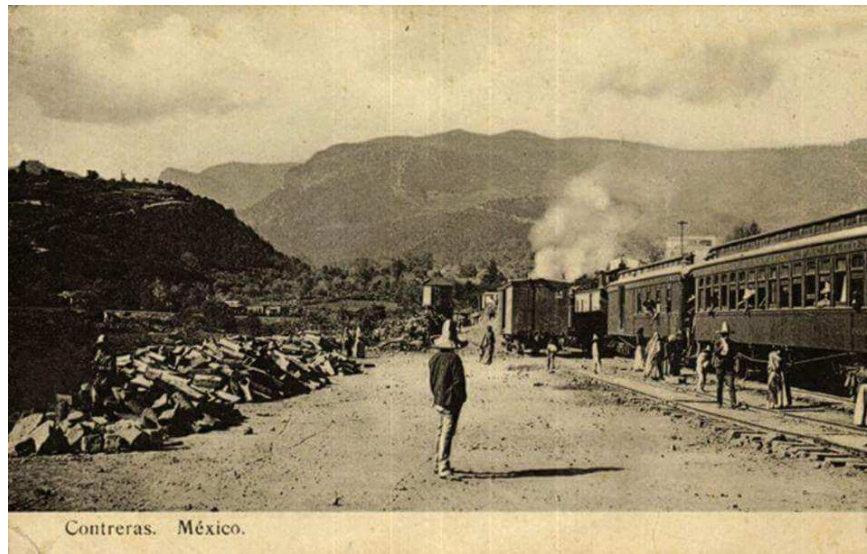
Figure 25. Map of communication routes between Mexico, D.F. and Cuernavaca, Morelos 1868, 19th century.



The Cuernavaca Railroad has three stations in the Municipality of San Angel: El Olivar, Contreras and Eslava. Source: Mediateca INHA.

The Mexico-Cuernavaca railroad was used primarily for passenger and commercial freight transportation for many years. The proximity to the center of Mexico City was a factor that boosted the market in the study area, in addition to the construction and articulation of the factories on the railways, increased and facilitated the supply of raw material to the factories.

**Figure 26. The Mexico-Cuernavaca railroad in Contreras.**



Source: Mexico en Fotos Digital archive.

It connected the companies in the region by means of branch lines, such as the *Loreto*, *La Hormiga*, *La Abeja*, *Santa Teresa*, *El Águila* and *La Magdalena* factories, thus being linked to the railroad.<sup>111</sup>

**Figure 27. The factory La Magdalena in 1932.**



In the foreground are Álvaro Obregón Street and the neighborhood of La Concepción, and to the right, the Cuernavaca Railroad track and the old Magdalena Contreras station, the town of San Nicolás Totolapan can be seen in the background. Source: ICA/Aerofoto.

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<sup>111</sup> Camarena Ocampo Mario, *Jornaleros, Tejedores y Obreros. Historia social de los trabajadores textiles de San Ángel (1850-1930)*, Plaza y Valdes, México, 2001, p.34.

Also, around 1900 started the introduction of electric tram-lines, making the communication possible between the south and center of Mexico City, thing that not only favored the displacement of the inhabitants but of the goods as well.<sup>112</sup> The south was connected through San Ángel to the center of the city by electric streetcar lines such as the Chapultepec, Tizapán and Churubusco lines, the Valle line, and from Coyoacán to San Ángel.<sup>113</sup>

However, in the 1960s, the train line began to suffer financial and technical problems, in the 1990s, the Contreras station was no longer used, and was finally closed in 1997<sup>114</sup> due to lack of maintenance and obsolescence of its infrastructure. Since then, the station was left in a state of abandonment, and recently opened in what was left of its facilities as a community museum, called “Estación Contreras.”

### **III. Decline of the industry.**

The decline of the textile industry, which had been one of the main sources of employment, at the beginning of the 20th century, was affected by several factors, among them, of course, the Mexican Revolution, which affected production and commerce throughout the country, including the city, and which through the railroad lines even reached zones such as the study area.

Likewise, competition with other states in the country such as Monterrey and Guadalajara, and even with other countries such as the United States, affected the demand for products manufactured in Mexico City, not also mentioning the multiple crises that occurred during that period.

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<sup>112</sup> Cabrera Castillo Monserrat, « Las familias obreras en momentos de crisis: la huelga de la fábrica textil La Magdalena, 1967-1971 », Thesis in history, Universidad Nacional Autónoma de México, Facultad de Filología y Letras, 2013, p.15

<sup>113</sup> Fernández del Castillo, Francisco, *Apuntes Para La Historia De San Ángel (San Jacinto Tenanitla) Y Sus Alrededores*, Impr. del Museo Nacional de Arqueología, Historia y Etnología, México, 1913, p.240

<sup>114</sup> López Gónzales Valentín, « El ferrocarril de Cuernavaca 1897-1997 », Gobierno del Estado de Morelos, Secretaría de Bienestar Social, Dirección General de Relaciones Pública, Instituto Estatal de Documentación, México, 1997, p. 8

Also driven by workers in search of better wages, fair working conditions and labor rights, multiple workers' strikes took place in Mexico City, such as the tramway workers' strike in 1913, the textile workers' strike in 1918 and the electricians' strike in 1919.<sup>115</sup>

One law that contributed to the displacement of industry from Mexico City to the outskirts of the city was the Industrial Zoning Law, enacted in 1947.<sup>116</sup>

The Law established that industrial companies should be located in specific areas of the city, called industrial zones, which were located on the outskirts of the city with the objective of controlling urban sprawl and improving the quality of life of the inhabitants, reducing pollution and noise generated by industrial activity.

Unfortunately, the textile industry was one of the main sources of pollution in Mexico City during the 20th century. Textile production generated a large amount of waste and emissions that affected air, water, and soil quality in the city.

First, textile production required large amounts of water, which was used in the textile manufacturing processes.

This water, once used, was discharged into rivers and lakes near the city, contaminating the water and affecting the health of the people who used it. Francisco del Castillo refers to the problem of abuses committed by the textile companies in San Ángel. He mentions that, although there have been attempts to take measures to regulate the industry, but in the end, the need of these companies has prevented their compliance. He also mentions the sadness of seeing towns in decline due to the lack of water,<sup>117</sup> something that was a recurring complaint before the authorities, as Arturo Mora points out in his text *Cristal Bruñido: Río de la Magdalena*.<sup>118</sup>

In addition to the abuse of water, the industry also involved the use of chemicals for finishing textiles, substances that were discharged into the water and surrounding area. These

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<sup>115</sup> See Camarena Mario. «Disciplina E Indisciplina: Los Obreros Textiles Del Valle De México En Los años Veinte». *Historias*, n.º 7, 1984, pp. 3-14.

<sup>116</sup> Diario Oficial de la Federación, «Ley de Planificación y Zonificación para el Distrito Federal», 1941.

<sup>117</sup> Fernández del Castillo, Francisco, *Apuntes Para La Historia De San Ángel (San Jacinto Tenanitla) Y Sus Alrededores*, Impr. del Museo Nacional de Arqueología, Historia y Etnología, México, 1913, p.240

<sup>118</sup> Soberón Mora, Arturo, «Cristal Bruñido: Río de la Magdalena», in *Dimensión Antropológica*, Año 22, vol. 64, may- august, 2015



environmental problems contributed to the implementation of measures to control industrial pollution in the city, such as the Industrial Zoning Law I mentioned earlier.

Regarding *Los Dinamos*, in 1961, the Directorate of Hydraulic Use of the Ministry of Agriculture commissioned the engineer Raúl Sánchez Espejel to determine the real operating capacity of the *Dinamos*. During this inspection, he found that the second Dinamo had already been out of service for more than two years. In fact, the plants in Magdalena Contreras were no longer interested in producing hydroelectric power, as it was more profitable for them to buy electricity from power companies. It was finally this inspection that triggered the closure of the plants located in the area due to their low productivity<sup>119</sup>.

From the 1960s onwards, the urban landscape was transformed: urbanization in the area grew strongly due to the construction of new highways and contributed to the contamination of the river. In this logic of urbanization of the territory, the leaders sold land in the municipality at very low prices, both to the local population and to people outside the area. With regard to the current infrastructure, we can see that there are no longer large poles and industrial centers present in the municipality.

Following the closure of the power plants, the old properties and factories, a process of relegation and deterioration, as evidenced by the current state of some buildings or their destruction

This study has collected the oral testimony of Sarid Rodríguez, the owner of a local drink store next to the second *Dinamo*, who is also the grandson of a former worker who worked in one of the hydroelectric plants of *Los Dinamos*:

*« My grandfather used to work here, he told me that at some point the electricity produced was not enough and that it was easier to buy the service directly instead of producing it. It's a pity that the other Dinamos are in a very bad state, my grandfather told me that it was really impressive to hear the turbines running at full speed [...] The government only exploits the resources and doesn't give money for the protection of these sites. We who work here are the ones who make sure that there is no vandalism, you see, I take care of this Dinamo<sup>120</sup> ».*

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<sup>119</sup> Zamora Saenz I. Benedicto, «Dos modelos de gestión en la historia del río Magdalena, Ciudad de México. El repartimiento colonial y la Junta de Aguas», in *Cuicuilco* (Revue de sciences anthropologiques), México, vol. 25, n° 71, 2018, p. 111-138.

<sup>120</sup> In particular, Sarid Rodríguez explained that he was the one using the second Dinamo as a place to store his food cart.

#### **IV. Conclusions of Chapter II**

During 1880-1910 there was significant growth and transformation linked with the textile industry in the study area. The prosperity of the textile factories in the south of the Federal District was not only due to natural factors, but there were also other elements such as the economic, social, and institutional structure.

When the first factories were established in Contreras, the context was propitious economic and political, investments in the region and political stability as a result of the Porfiriato that allowed the emergence of technological innovations and investments by foreigners in Mexico, allowing the modernization of production through the acquisition of state-of-the-art machinery for the middle of the first industrial revolution and the beginning of the second, allowing locals to supply the raw material facilities.

On the other hand, entrepreneurs such as Sebastien Robert and other *Barcelonetes* appeared, their community, key figures who served as industrial developers of the study area.

This made the textile industry in the study area a pioneer in incorporating technological advances, such as the use of driving force in the production of electric energy, as was the case of *Los Dinamos*, hand in hand with great engineers and architects of the time, such as Miguel Angel de Quevedo and the Pani brothers.

Making of the study area a system composed of towns, factories, services, and resources.

## **Chapitre III. Le patrimoine existant aujourd'hui dans le système de la Magdalena.**

### Résumé

Ce chapitre identifie l'héritage de l'industrie textile dans la zone d'étude en passant brièvement en revue et en réfléchissant aux définitions de paysage, de paysage culturel et de paysage industriel, et en analysant les raisons pour lesquelles il est considéré comme un patrimoine. Il explique les différentes catégories de classification du patrimoine industriel, telles que protégé (ou avec usage), en danger et perdu, pour un usage ultérieur, et explore les notions de modification du paysage culturel ou industriel, qui constituent la base des processus de reconversion, de réhabilitation et de valorisation du patrimoine, et permettent de méditer sur le potentiel des vestiges dans le contexte de son territoire.

Le chapitre développe également l'identification du patrimoine encore présent dans la zone d'étude, selon les catégories mentionnées, et à travers une étude architecturale, spécifiquement dans le *Dinamos*, vise à donner une vue d'ensemble des styles architecturaux, des techniques de construction et des matériaux utilisés. Il présente également une analyse d'une étude photographique qui capture les éléments architecturaux clés, la matérialité et les relations spatiales, afin d'établir un diagnostic et d'évaluer leur état de conservation,

Enfin, il y a les conclusions et les considérations finales.

## **Chapter III.**

### **The existing heritage today in the Magdalena system.**

This chapter identifies the legacy of the textile industry in the study area by briefly reviewing and reflecting on definitions of landscape, cultural landscape, industrial landscape, and analyzing the reasons why it is considered heritage. It explains the various categories of classification of industrial heritage, such as protected (or with use), endangered and lost, for further use, and explores notions of modification of cultural or industrial landscape, which form the basis of processes of reconversion, rehabilitation and valuation of heritage, and make it possible to meditate on the potential of the vestiges within the context of its territory.

The chapter also develops the identification of the heritage still present in the study area, according to the mentioned categories, and through an architectural survey, specifically in the *Dinamos*, aims to give an overview of the architectural styles, construction techniques and materials used. It also presents an analysis of a photographic survey that captures the key architectural elements, materiality and spatial relationships, to make a diagnosis and evaluate their condition of conservation,

Finally, there are the conclusions and final considerations.

#### **I. Notions of Landscape, industrial landscape and heritage.**

##### *a. Landscape.*

The concept of landscape has been defined and addressed by multiple disciplines over time, being the term related to geography, ecology, architecture, art and urbanism, among others.

For this work, the definition of the Florence Charter, also known as the "Charter for the Protection and Management of Landscape Heritage" drafted by the European Landscape Convention in 2000, defines landscape as:

“*Landscape* means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.”<sup>121</sup>

The definition considers that landscape is a complex entity, involving not only natural and anthropic factors. By "perception" it includes the way in which the territory is experienced by the people who pass through or inhabit it, not only limiting it to the visual appearance of a place.

The Charter was drafted with the aim of being a guide to promote the protection, management and sustainable planning of landscapes in Europe, so its definition of landscape is aimed primarily at the member countries of the Council of Europe, however, its principles and approaches have influenced the promotion and management of landscape at the international level, by its emphasis on the cultural, environmental and social relationship, and by the principles and guidelines it establishes for the protection and management of the landscape. It prioritizes the valuation and conservation of landscapes and emphasizes the importance of landscape diversity and identity, as well as the need for protection, management and planning.

With respect to the latter, the charter also values the active participation of people and stresses the importance of designing and planning to reflect the needs and aspirations of the community, underlining the need to conserve and manage landscapes in a sustainable manner, preserving them in the long term. In doing so, it ensures the protection of biological and cultural diversity, and consideration of resilience.

Landscapes, due to their cultural, historical, aesthetic and natural value, are also recognized and protected as heritage, allowing actions such as preserving and transmitting to future generations the richness and diversity of these natural and cultural environments. Not only the Council of Europe gives value and meaning to the landscape, one of the most important institutions that support its value as heritage is UNESCO through its World Heritage program, which recognizes that some landscapes have an exceptional and universal value for

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<sup>121</sup> Council of Europe « Council of Europe Landscape Convention (ETS No. 176) ». Florencia, 2000. 01/03/2004 (Ratifications.) Retrieved: March 2022 from: <https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&treatynum=176>

humanity.<sup>122</sup> These landscapes, both natural and cultural, are considered treasures that should be protected and conserved because of their historical, cultural or aesthetic significance.

*b. Cultural Landscape.*

The term “cultural landscapes” refers to the interaction between people and their environment, which has left significant changes in the physical landscape. UNESCO recognizes it as a category and defines it as:

“The joint work of nature and man”<sup>123</sup>

This particular concept recognizes human beings as the subject in the predicate, the one who performs the actions that modify nature, and also gives it meaning and cultural value through the performance of activities and their respective practices, which activities can be such as agriculture, traditions or beliefs, roads, human settlements, architecture.

*c. Industrial Landscape*

The *Nizhny Tagil Charter* on Industrial Heritage defines *Industrial heritage* as that which is composed of the remains of industrial culture possessing historical, technological, social, architectural or scientific value. While the *Nizhny Tagil Charter* does not mention the term industrial landscape, it does go so far as to refer to the need for protection of industrial sites, recognizing and explaining the historical process of transformations that led and stimulated the process of change in different territories.<sup>124</sup>

*The Dublin Principles*, in addition to giving a series of guidelines and recommendations for the conservation and management of industrial heritage, provide within their general definition a precise definition of landscape. According to these principles, industrial landscapes are

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<sup>122</sup> UNESCO «Cultural landscapes.», (n.d.).Retrieved November 2022, from: <https://whc.unesco.org/en/culturallandscapes/>

<sup>123</sup> UNESCO. « Convención para la protección del patrimonio mundial cultural y natural. », 1992. Retrieved January 2023 from: <https://whc.unesco.org/archive/convention-es.pdf>

<sup>124</sup> ICOMOS, «Carta de Nizhny Tagil sobre el Patrimonio Industrial», 2003. Retrieved January 2023, from: <https://docplayer.es/43559600-Carta-de-nizhny-tagil-sobre-el-patrimonio-industrial.html>

defined as areas that have been transformed and shaped by industrial activity and that possess historical, cultural, social or aesthetic value.<sup>125</sup>

The term industrial landscape therefore falls under the category of cultural landscapes, but is more specific, referring specifically to the physical and visual environment resulting from industrial activity and the presence of infrastructure and buildings associated with the production and manufacture of goods, such as factories, smokestacks, silos, pipes, cooling towers and other industry-related elements.

One example of a cultural landscape with industrial production in Mexico is the *Ruta de la Plata* (Silver Route) in the state of Guanajuato. This region is renowned for its rich mining history and the production of silver, which played a crucial role in the Spanish colonization of Mexico.

The *Ruta de la Plata* includes several towns and sites that showcase the cultural landscape of industrial production. One notable town is Guanajuato City, which was once a major silver mining center. The landscape of Guanajuato City features colonial-era mining infrastructure, such as underground mines, tunnels, and processing facilities. The town's historic center, a UNESCO World Heritage site, is characterized by narrow streets, colorful colonial buildings, and grand plazas that reflect the town's silver wealth.<sup>126</sup>

Another example is the agave landscape and industrial facilities of *Tequila*, located in the state of Jalisco, inscribed in 2006.<sup>127</sup>

The landscape of agaves and old industrial facilities of tequila represents a cultural tradition and way of life that has persisted for centuries in the tequila region of Mexico. This landscape combines the production of tequila with the natural landscape of the blue agave fields, as well as the old industrial facilities where the agave is processed to produce the spirit.

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<sup>125</sup> ICOMOS – TICCIH, *The Dublin Principles*, 28 November 2011. Recovered: Mar. 2023, from: [https://ticcih.org/about/about-ticcih/dublin-principles/from:https://www.icomos.org/images/DOCUMENTS/Charters/GA2011\\_ICOMOS\\_TICCIH\\_joint\\_principles\\_EN\\_FR\\_final\\_20120110.pdf](https://ticcih.org/about/about-ticcih/dublin-principles/from:https://www.icomos.org/images/DOCUMENTS/Charters/GA2011_ICOMOS_TICCIH_joint_principles_EN_FR_final_20120110.pdf)

<sup>126</sup> UNESCO « Camino Real de Tierra Adentro. », 2010. Retrieved March 2023, from <https://whc.unesco.org/es/list/1351#:~:text=Utilizado%20entre%20los%20siglos%20XVI,e%20mercurio%20importado%20de%20Europa.>

<sup>127</sup> UNESCO, « Agave Landscape and Ancient Industrial Facilities of Tequila », 2006. Retrieved June 2023, from <https://whc.unesco.org/en/list/1209>

The study and preservation of the industrial landscape is important to understand the economic and social history of a region, as well as to be congruent in its revitalization and transformation. These landscapes can have significant cultural and heritage value, and their preservation can contribute to the conservation of the collective memory and identity of a community.

*d. Notions of landscape modification.*

Landscape modification refers to changes made by human activities to the physical and cultural environment. These modifications can be temporary or permanent in nature, and can have a significant impact on the appearance, function and meaning of the landscape.

Primary activities such as agriculture have played an important role in shaping landscapes. Similarly, changes in agricultural practices, such as the introduction of techniques, technology and crops, can modify land use, cropping patterns and the visual appearance of rural areas. The same can be said of livestock or forestry.<sup>128</sup>

Urbanization and urban development are another factor that modifies the landscape, derived from the practice of economic activities in the territory, which is reflected in the growth of towns and their expansion, have a considerable impact on the modifications that affect the landscape. The construction of buildings, public spaces and urban services transform the appearance and structure of urban environments. Today, this implies, for areas with a long past, the demolition of historic structures, the reconfiguration of public spaces, the introduction of new architectural and landscape elements.<sup>129</sup>

The construction of transportation and communication infrastructure, such as roads, highways, railways, bridges, airports or infrastructure for other means of transportation and communication can significantly alter the landscape. These infrastructures can both divide and connect previously isolated areas, influence development patterns, create their own landscapes, and change the relationship between people and their environment.

These are just a few examples of the multiple ways in which the landscape is modified by human activities, which can have both positive and negative impacts on the territory and

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<sup>128</sup> See more in Marull, J., et al. « The Changing Nature of Rural Landscapes: Agricultural Modernization and Its Socio-environmental Consequences. », *Environmental Science & Policy*, 2018.

<sup>129</sup> Gómez Márquez, I., et al. « La transformación del paisaje cultural urbano y su incidencia en la identidad. » *Arbor*, 2019.



society. To give an example, some of the photographs we have of the study site, recovered from the *Archivo Histórico del Agua* (AHA), were taken to respond to the demands made by the neighbors of towns like *San Nicolas*, *Contreras* and *San Jeronimo*, to the government, denouncing factories and water withdrawals from the Magdalena River.<sup>130</sup> To give another example, within the valuable compilation of oral sources that Cabrera Castillo's thesis<sup>131</sup> provides on the life of working families, one can see the sense of identity that the factories gave to the workers and their families.

Finally, and because of the above, I would like to mention the modifications that tourism and recreational development have on the landscape, especially because it concerns new uses of the industrial heritage, these modifications seek to give value to the elements that compose and stage the industrial landscapes, which are and were essential elements of development, tradition and identity within the cultural landscape.

The objective of several projects of this nature is to highlight rather than lose the tangible and intangible heritage of industrial centers.

These activities also generate changes in the landscape as infrastructure and services are developed to attract visitors, as with the construction and opening of lodging, food, new infrastructure and equipment businesses, which alter the landscape. There are also cases where the authenticity and quality of the cultural landscape has been taken to the extreme and lost.<sup>132</sup> Careful consideration of planning and management of change is therefore necessary to preserve the integrity and value of the landscape.

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<sup>130</sup> Archivo Histórico del Agua, Box. 571, Exp. 8315, Fund. Aprovechamientos Superficiales.

<sup>131</sup> Cabrera Castillo Monserrat, « *Las familias obreras en momentos de crisis: la huelga de la fábrica textil La Magdalena, 1967-1971* », Thesis in history, Universidad Nacional Autónoma de México, Facultad de Filología y Letras, 2013.

<sup>132</sup> Buckley R., « Sustainable Tourism: Research and Reality », *Annals of Tourism Research*, 39(2), p. 528-546, 2012.

*e. Analysis of the industrial landscape.*

The analysis of the industrial landscape will be conducted at two scales, one contemplating the system, taking the study area as a whole, and the other focused directly on the *Dinamos* of *Los Dinamos* ecotourism park. The aim is to carry out an analysis that responds to the criteria for the conservation of industrial landscapes, according to the Dublin Principles 2011, which justify both industrial landscapes and the elements that compose them as valuable elements that deserve to be recognized, conserved and used in a sustainable manner for the benefit of present and future generations.

Therefore, the industrial landscape of the Magdalena River will be able to justify at the end of this chapter the following values and usages:

- 1) Historical and cultural value.
- 2) Social value.
- 3) Aesthetic and scenic value.
- 4) Educational and didactic value.
- 5) Sustainability and adaptive use.
- 6) Participation and collaboration.

In order to identify and present the legacy of the industrial heritage at the first scale, a general map of the location of the complexes and their heritage status will be presented, which will be developed in a card format to complement the data on the map.

Industrial heritage can present itself in different conditions, ranging from being in active operation, in the process of restoration, to being out of use or vestige. Each condition implies different approaches and challenges in terms of conservation, management and use.

In this case, the following categories will be used:

-Adapted to new uses: referring to industrial heritage that has been adapted and reused for purposes other than the original industrial ones. This involves the transformation of industrial spaces into places such as cultural centers, museums, exhibition spaces, educational centers or commercial spaces, not leaving aside their industrial past.

-Other uses: referring to industrial heritage that has been adapted and reused for purposes other than the original industrial ones but cannot be appreciated.

- Remnant: referring to industrial sites that have fallen into a situation of disrepair and have become ruins or abandoned vestiges. Although in disrepair, they retain historical value and may have potential for rehabilitation and conservation.

- Lost: referring to industrial heritage that is no longer present.

For the second part of this chapter, with the particular focus on *Los Dinamos*, the instruments of analysis are the architectural survey, the inventory and the registry, illustrated with drawings and photographs, creating documentation of the patrimonial property and already having the historical background in the previous chapter.

Presenting the configuration of the complex by means of the following studies:

- Architectural survey
- Spatial characteristics
- Photographic survey.
- Diagnosis and condition of conservation.

With the purpose of having information that contributes to the preservation of the architectural complex in the ecotourism park *Los Dinamos*.

## **II. The industrial heritage of the Magdalena River System**

### *a. Current status of the Magdalena River patrimony*

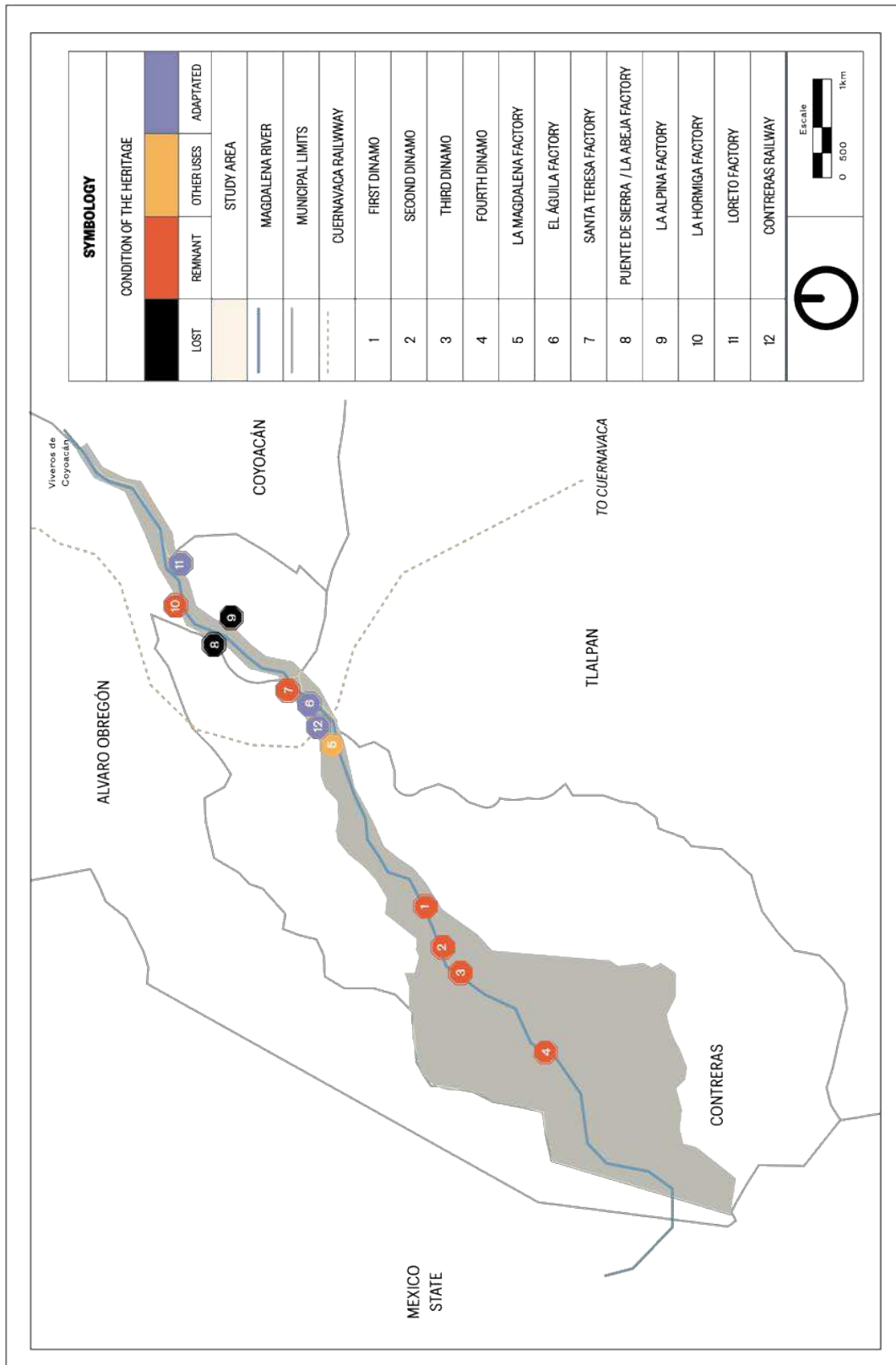
Of the testimony left by the textile production in the Magdalena River system, despite having ceased to function as manufacturing centers, there are still vestiges of the industrial past along the way, from the four *Dinamos* and factories to some houses and working-class neighborhoods, infrastructure and technology.

In the map shown in Figure 28, the state of the industrial heritage of the Magdalena River system is classified according to the four conditions mentioned above: adapted to new uses,

other uses, remnant and lost. Within this system there are a total of twelve components that will be described in depth in subsequent sections. It is worth mentioning that of these twelve, six were evaluated as remnants, being the four *Dinamos*, *Santa Teresa*, and *La Hormiga*. *La Magdalena*, as a heritage site with other uses. The factories *El Águila* and *Loreto*, as well as the old *Contreras railroad station* make up the group of three within "adapted uses" and the last two components, the *Puente de Sierra* and *Alpina* factories as lost heritage.

Complementary to the map, Table 5. compiles the subdivisions of these components, the institution that catalogs them as heritage, being mainly INAH, and the reference number under which they can be found within the cataloging system of the institution.

**Figure 28. Condition of the Heritage.** In the Magdalena System.



Source: Elaborated by the author based on INEGI, Dirección General de Medio Ambiente y Ecología and Google Earth.

**Table 5. Catalogued heritage properties.**

#	Name	Inmuebles catalogados	Institution	Reference #
1	First Dinamo	1er., <i>Dinamo</i>	INAH	I-0014200088
2	Second Dinamo	Segundo <i>Dinamo</i>	INAH	I-0014200089
3	Third Dinamo	Tercer <i>Dinamo</i>	INAH	I-0014200090
4	Fourth Dinamo	Cuarto <i>Dinamo</i>	INAH	I-0014200091
		Puente del 4o. <i>Dinamo</i>	INAH	I-0014200092
5	La Magdalena	Fábrica La Magdalena: Centro Nacional de Inteligencia, Casa de empleados, Iglesia Inmaculada Concepción	INAH	I-0014200036 to I-0014200042
		Casa de Bellas Artes "Juventino Rosas"	INAH	I-09-03614
		Casa de raya, panadería.	INAH	I-0014200044 to I-0014200045
6	El Águila	Foro Cultural Contreras-Inmueble Producción	INAH	I-0014200031 to I-0014200035
		Casas de trabajadores-Inmueble Civil.	INAH	I-0014200019 to I-0014200021
7	Santa Teresa	Fabrica Santa Teresa-Inmueble Industrial	INAH	I-09-03598
		Puente Santa Teresa-Inmueble Civil	INAH	I-0014200079
		Inmueble Civil.	INAH	I-0014200080 to I-0014200082
8	Puente de Sierra La Abeja	-	-	-
9	La Alpina.	-	-	-
10	La Hormiga	Clínica IMSS 8	-	-
11	Loreto	Plaza Loreto-Inmueble Industrial	INAH	I I-0013300060 to I-0013300066
		Casas de trabajadores de la Fábrica de Papel de Loreto	INAH	II-0013300067
12	Contreras Railway	Railway Museum	DGPHAC	F-1358-8700-1

Source: Own elaboration with information from: Procuraduría Ambiental y del Ordenamiento Territorial, Patrimonio Cultural.

b. La Magdalena factory (5)

**Figure 29. La Magdalena factory.**



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In red, catalogued heritage, blue line Magdalena River. Source: Own elaboration, image from Google earth.

What used to be the old *La Magdalena* factory, located in the Magdalena Contreras district, between the streets Emiliano Carranza at the point where it becomes Alvaro Obregón Avenue, to the north, to the east Camino Real de Contreras Street, to the south bounded by the Magdalena River and to the west by *Tinaco* Street, today remains partially preserved and subdivided into several government and privately owned properties. Within the states of conservation proposed in this chapter, this property remain as "other uses".

The parts that used to make up the old factory are located in the northwest and southeast part of the block where the factory was located and are catalogued by the INAH. These subdivisions are made up of the old *obraje*, today used as offices of the *Centro de Investigación y Seguridad Nacional* - CISEN (Center for Research and National Security); the employee's house, as government offices; two tall chimneys within the limits of the CISEN grounds; the church and rectory of the Immaculate Conception; the old *raya*<sup>133</sup> store and bakery, today housing; and finally the house of the owners of the factory, today the government owned Fine Arts House, "Casa de Bellas Artes Juventino Rosas".

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<sup>133</sup> Store located inside the large haciendas and factories where workers could acquire the products necessary for their survival by deducting their salary.

The complex, in all its components, has been remodeled and has preserved spaces and elements such as the chimneys, walls, perimeter walls, roofs, ceilings, vaults and windows.

The well-preserved brick chimneys, known as Chacuacos<sup>134</sup> 1 and 2, denote the complex's former industrial vocation.

**Figure 30. Los Chacuacos 1 y 2**



Source: INHA *Consulta Pública del Catálogo Nacional de Monumentos Históricos Inmuebles*.

The rectory, the temple of the Immaculate Conception, also known by the locals as La Conchita, built around 1641 by Don Tomás de Contreras<sup>135</sup> as a chapel and rooms for employees, has a neoclassical style quarry façade, with clock finial, and framed by bell towers. According to the INAH<sup>136</sup>, the temple conserves three bells dated 1846, 1875 and 1896, besides the old mechanism of the central clock, which is in operation.

The building on the left side of the church has two levels that function as offices and share part of the façade with the Casa de las Bellas Artes Juventino Rosas<sup>137</sup>. The façade of this building is made of exposed rough stone with framed openings and brick borders. The central atrium is garden with a circular quarry fountain.

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<sup>134</sup> Chacuaco: colloquial term in Mexico to refer to -chimneys (pipes for smoke to come out). Source Real Academia Española.

<sup>135</sup> Don Tomas de Contreras, founder of the *obraje* de Contreras. He placed an image of Jesus of Nazareth, brought from Spain in the former chapel of the Immaculate Conception known as El Señor de Contreras.

<sup>136</sup> Catálogo Nacioal de Monumentos Históricos Inmuebles, Consulta Pública, Rectoría de la Inmaculada Concepción. [https://catalogonacionalmhi.inah.gob.mx/consulta\\_publica/detalle/13091](https://catalogonacionalmhi.inah.gob.mx/consulta_publica/detalle/13091), Retrived 5 June 2023.

<sup>137</sup> Juventino Rosas, Mexican musician and composer, known for the waltz "Sobre las olas", composed in Contreras.



**Figure 31. Facade of the Inmaculada Concepción church on the left and on the right the "Juventino Rosas" House of Fine Arts.**



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Source: INHA *Consulta Pública del Catálogo Nacional de Monumentos Históricos Inmuebles*.

The *Casa de Bellas Artes "Juventino Rosas"*, was formerly the residence of the owners of the textile factory La Magdalena and besides being adjacent to the temple, it is also adjacent to the National Intelligence Center.

The house of the arts distributes rooms used as painting and engraving workshops, a half-basement cellar, an interior garden and access to the upper floor that houses the arts and crafts room, music, dance and offices. The offices, which have independent access through the plaza, belong to the *Subdirección de Servicios Educativos y Culturales* (Educational and Cultural Services Subdirection) of the municipality.

**Figure 32. Former *raya* store and bakery.**



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Source: INHA *Consulta Pública del Catálogo Nacional de Monumentos Históricos Inmuebles*.

Finally, the old *raya* store and bakery, data provided by the neighbors to INAH, are buildings attached to the temple of a single level, whose side facade retains part of the original structure.

In general, the preserved parts of the subdivided buildings are in a good state of preservation, more from its previous stage as *Obraje* than from the factory.

*c.El Águila (6)*

**Figure 33. El Águila factory.**



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Catalogued heritage in red, blue line Magdalena River. Source: Own elaboration, image from Google earth.

The former *El Águila* yarn and fabric factory located on *Camino Real de Contreras* Street, a few steps from the former *La Magdalena* factory and bounded on the south by 1st Contreras Street and on the east by the Magdalena River. Since 1978 it was a building adapted as a cultural and recreational forum, owned by the Mayor's Office of *La Magdalena Contreras*. Unlike the *La Magdalena* factory, this building did not undergo subdivisions and also preserves in its surroundings neighborhoods such as the "*Barrío Calles*" that are owners of buildings of workers' housing catalogued as heritage.

The spaces of the factory have been adapted to open-air forum, multipurpose room, offices of the municipality, auditorium, gallery, library, sculpture room, basement and also retains machinery and elements of its industrial era, as the chimney, its own dynamo and the pipe-aqueduct of the fall of the same. There are also plazas, stairways, interior gardens and outdoor areas with basketball and soccer courts, restrooms and parking.

In the garden is preserved the high chimney, or *chacuaco*, of red brick, near the chimney, there is an iron pipe aqueduct that provided water from the Magdalena River. (Fig 34).

**Figure 34. Chimney and aqueduct in the Águila factory**



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Source: INHA *Consulta Pública del Catálogo Nacional de Monumentos Históricos Inmuebles*.

Figure 33 shows the location of the *Plazuela* bridge, also catalogued, which communicated the factory with the employees' houses in *Barrio de las Calles*. The *Contreras Elena Poniatowska* Cultural Forum, where a dynamo and an antique loom brought from the factory *La Hormiga* are preserved, is a rectangular building of two levels, with ironwork windows framed with stone and brick, with molded brick cornices, and a system of concrete beams on the roof (Fig 35). The building has different spaces, such as the auditorium, the gallery, the library, offices, multipurpose rooms and a basement. To the north of the forum is the building where the aqueduct is embedded towards the old town, today the offices of the delegation. This section of the building preserves original walls and openings.

**Figure 35. Facade of the building where the dynamo and its interior are preserved.**



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Source: INHA *Consulta Pública del Catálogo Nacional de Monumentos Históricos Inmuebles*.

The houses marked in the southern zone of Figure 33, in the Calles neighborhood, are rectangular in plan, single-story but double-height, and have flattened walls and facades. Some houses retain elements such as concrete floors, original openings and doors (Fig 36). They consist of living room, dining room, kitchen, bathroom, in the case of the one closest to the factory, basement and 1 to 2 bedrooms.

**Figure 36. El Águila factory.**



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Source: INHA *Consulta Pública del Catálogo Nacional de Monumentos Históricos Inmuebles*.

*d. Santa Teresa (7)*

**Figure 37. Santa Teresa factory.**



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Catalogued heritage in red, in pink the Santa Teresa Church, in blue the Magdalena River. Source: Own elaboration, image from Google earth.

The *Santa Teresa* factory, formerly located in the neighborhood of the same name, in the Magdalena Contreras district, currently retains its remnants along Mexico Avenue and the streets of *Santa Teresa*.

Currently, what was once the old factory site has been subdivided and is divided into several privately owned lots. Most of the vestiges of the factory are the perimeter walls of the 3 houses

and the housing unit "Santa Teresa" (Av. Mexico 1256) and the horizontal condominium "Bosque Santa Teresa" (Av. Mexico 1080), which still preserve them.

The walls are high walls of volcanic stone and brick finials, both in the large openings, now seen to have been filled with the same material, and in the upper part of the walls.

The entrance door, visible in Figure 38, at the middle of the extension, is of wood with pillars covered in quarry stone and with lintel ledge.

**Figure 38. Santa Teresa Northern walls.**



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Source: INHA *Consulta Pública del Catálogo Nacional de Monumentos Históricos Inmuebles*.

The church of Santa Teresa, marked in pink in Figure 37, at street level, is located next to the old stables and ends the part of the wall preserved on the north side of Avenida México, with two pilasters and an iron gate.

The wall on the south side of the avenue, made of the same materials, is of a lower height and in some sections has cyclone mesh. This wall is plastered in some areas and painted red at the bottom to give continuity to the urban image of the area, as can be seen in Figure 39.

**Figure 39. Southern wall of the Santa Teresa factory.**



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Source: INHA *Consulta Pública del Catálogo Nacional de Monumentos Históricos Inmuebles*.

The properties marked in Figure 37, on the north side of Mexico Avenue, could not be accessed due to their private nature. However, INAH, in their system of Public Consultation of the National Catalog of Historic Monuments, mentions that they are the remains of the stables<sup>138</sup>. Finally, the property in the southeast part of figure 37, located at 1080 Mexico Avenue, again the remaining walls were part of the factory.

**Figure 40. Santa Teresa walls in the *Bosque Santa Teresa* horizontal condominium.**



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Source: INHA *Consulta Pública del Catálogo Nacional de Monumentos Históricos Inmuebles*.

*e. Loreto (11)*

**Figure 41. Loreto and its working-class neighborhood.**



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In the upper part of the image, the neighborhood, in the lower part, Plaza Loreto, which today occupies the vicinity of the factory. In blue dotted line, the piped Magdalena River. Source: Own elaboration, image from Google earth.

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<sup>138</sup> Catálogo Nacioal de Monumentos Históricos Inmuebles, Consulta I-0014200082.

[https://catalogonacionalmhi.inah.gob.mx/consulta\\_publica/detalle/13134](https://catalogonacionalmhi.inah.gob.mx/consulta_publica/detalle/13134), Retrived 7 June 2023.

The old *Loreto* factory, marked as adapted heritage on the Figure 28 plan, currently houses the privately owned commercial and cultural center called "*Plaza Loreto*". Located between *Altamirano Street* to the north, *La Otra Banda street* to the east, the *Magdalena River* to the south and *Campamento street* to the west. The northern part of Figure 41 shows the former working-class neighborhood of the *Loreto* and *Peña Pobre Paper Mill*, located between *Altamirano* and *Loreto Streets* in the *Alvaro Obregón* municipality. Due to several fires that the building suffered<sup>139</sup> the property has had several interventions throughout its time as a factory from (1840 to 1986), however it sought to preserve the architectural typology.

**Figure 42. Facade of Plaza Loreto on Altamirano Street.**



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Source: INHA *Consulta Pública del Catálogo Nacional de Monumentos Históricos Inmuebles*.

The property consists of four buildings, most of them two-story, an open-air forum, two parking lots with several levels and three main entrances on the roads.

The foundation is made of rough stone and the facades and walls are made of stone masonry and red brick lath in almost all the buildings of the building. The arched openings are framed with red brick and the walls are finished with smooth plaster and paint.

The larger building is made up of several wings with a gable roof and another part with a flat roof, around a central roofed courtyard. The space inside the building has been modified for its new commercial use. However, explanations of the industrial past of the building and its working-class neighborhood are not visible beyond the remaining elements.

An equally catalogued element that stands out inside the square is the old house of strong northern European influence, where the former owner of the factory with Germanic ascendancy

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<sup>139</sup> Catálogo Nacioal de Monumentos Históricos Inmuebles, Consulta Pública, Plaza Loreto.

[https://catalogonacionalmhi.inah.gob.mx/consulta\\_publica/detalle/10360](https://catalogonacionalmhi.inah.gob.mx/consulta_publica/detalle/10360), Retrived 7 June 2023.

lived, with a wooden structure and openings framed with quarry stone. It is currently used as a Mexican restaurant.

**Figure 43. *Taberna del León* Restaurant, former home of the *Loreto* Factory.**



Source: INHA *Consulta Pública del Catálogo Nacional de Monumentos Históricos Inmuebles*.

On the housing complex for the workers of the Loreto Paper Mill, in the northern part of Figure 41, known as the *Colonia Obrera*, consisting of 10 blocks and a total of one hundred and sixty-five remaining homes, which as of 2010<sup>140</sup>, are still in residential use.

**Figure 44. Loreto Worker's Neighborhood.**



Source: image from Google earth.

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<sup>140</sup> Muñoz Gómez M. Elizabeth, «La vivienda obrera de la fábrica de papel Loreto. Patrimonio industrial de la ciudad de México en peligro de extinción», in *Intervención. Revista Internacional de Conservación, Restauración y Museología*, n°10, 2014, p. 30-46.



**Figure 45. The *Contreras* train station**



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Source: Own elaboration from Google earth.

The *Contreras* train station, located in the *Magdalena Contreras* on *Emilio Carranza* Street, is an example of industrial heritage adapted, in this case to a museum and park, named *Parque Ferrocarril*. The building is federal property and is cataloged by the *Dirección General de Patrimonio Histórico, Artístico y Cultural de la Secretaría de Cultura del Gobierno de la Ciudad de México*, (General Directorate of Historical, Artistic and Cultural Heritage of the Secretariat of Culture of the Government of Mexico City) as tangible heritage.

In addition to the park, sports equipment, mural and kiosks, the property preserves part of the railroad tracks, the waiting room, the telegraph office, the stationmaster's office and living quarters. Everything is on one level and its construction is mainly made of wood.

**Figure 46. Telegraph and stationmaster's office.**



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Source: Photographs by Elisa Angeles. **October 2021.**

Its current use as a local museum, makes use of the facilities and mural "*Viaje del siglo XX*" (voyage of the twentieth century) by the muralist *Ariosto Otero* to present the history of the station.

**Figure 47. Contreras station Park.**



Source: Photographs by Elisa Angeles. October 2021

*g. The case of Puente de Sierra / La Abeja (8), La Alpina (9). and La Hormiga (10).*

As the map in the Figure 28 marks, *Puente de Sierra*, *La Alpina* factories are considered as lost heritage and due its proximity to this last one and having the smallest portion of vestiges the factory *La Hormiga* is marked in the map as being considered only remanent.

However, the three factories have remained somewhat present in the area where they were located. The *Puente de Sierra* factory at the limits of the Magdalena Contreras municipality within the urban reading remains as a neighborhood.

**Figure 48. Puente de Sierra neighborhood.**



Source: Own elaboration from Google earth.

In the case of the *Alpina*, in the same way as *Puente de Sierra*, only one street could be found that keeps memory of it, this time in a linear element within the urban fabric, the *Alpina* street near the *Hormiga* in the town of *Tizapán*.



It is also worth remembering that one of the looms of the *La Hormiga* factory, as I mentioned earlier, is located in the cultural forum that used to be the *El Aguila* factory.

*Puente de Sierra*, *La Alpina* and *La Hormiga* are part of the heritage within the system that has been lost. They remain in the urban memory, as neighborhoods, streets and businesses that bear their name.

### III. Configuration of the *Dinamos* of the Magdalena River.

#### a. *Los Dinamos* - Configuration of the complexe

*Los Dinamos* located alongside the *Camino a Los Dinamos* Road in the municipality Magdalena Contreras, in the specific coordinates of the *Table 6*, are a Remanent heritage according to the map of the *Figure 28*. The property regimen only variates in the case of the first *Dinamo*, that is part of the *ejido* property.

The *Dinamos* as a group are also identified as an archaeological group with the identification number C-09-03841.

According to the INAH record, the first *Dinamo* is owned by the community of *San Nicolás Totolapan*.

**Table 6. Identification of the *Dinamos* as catalogued heritage properties.**

	<i>First Dinamo</i>	<i>Second Dinamo</i>	<i>Third Dinamo</i>	<i>Fourth Dinamo</i>
<i>Coordinates</i>	19°17'19.96"N 99°15'55.70"O	19°17'3.72"N 99°16'26.00"O	19°16'53.14"N 99°16'41.73"O	19°15'59.14"N 99°17'35.34"O
<i>Current use</i>	-	Warehouse	Warehouse	Parking lot
<i>Catalogued by</i>	INAH			
<i>Identification</i>	I-0014200088	I-0014200089	I-0014200090	I-0014200091 and I-0014200092
<i>Regimen</i>	Other forms of ownership Ejido	-	Property of the Federal government	

Source: Own elaboration with information from : INHA Consulta Pública del Catálogo Nacional de Monumentos Históricos Inmuebles.

Thanks to previous visits to the site and the plans found in the *Orozco y Berra* map library, it was possible to identify the remnants of the complex: in addition to the four volumes that make up the *Dinamos*, it was also possible to identify the canals and regulating reservoirs that were built for their operation and start-up.

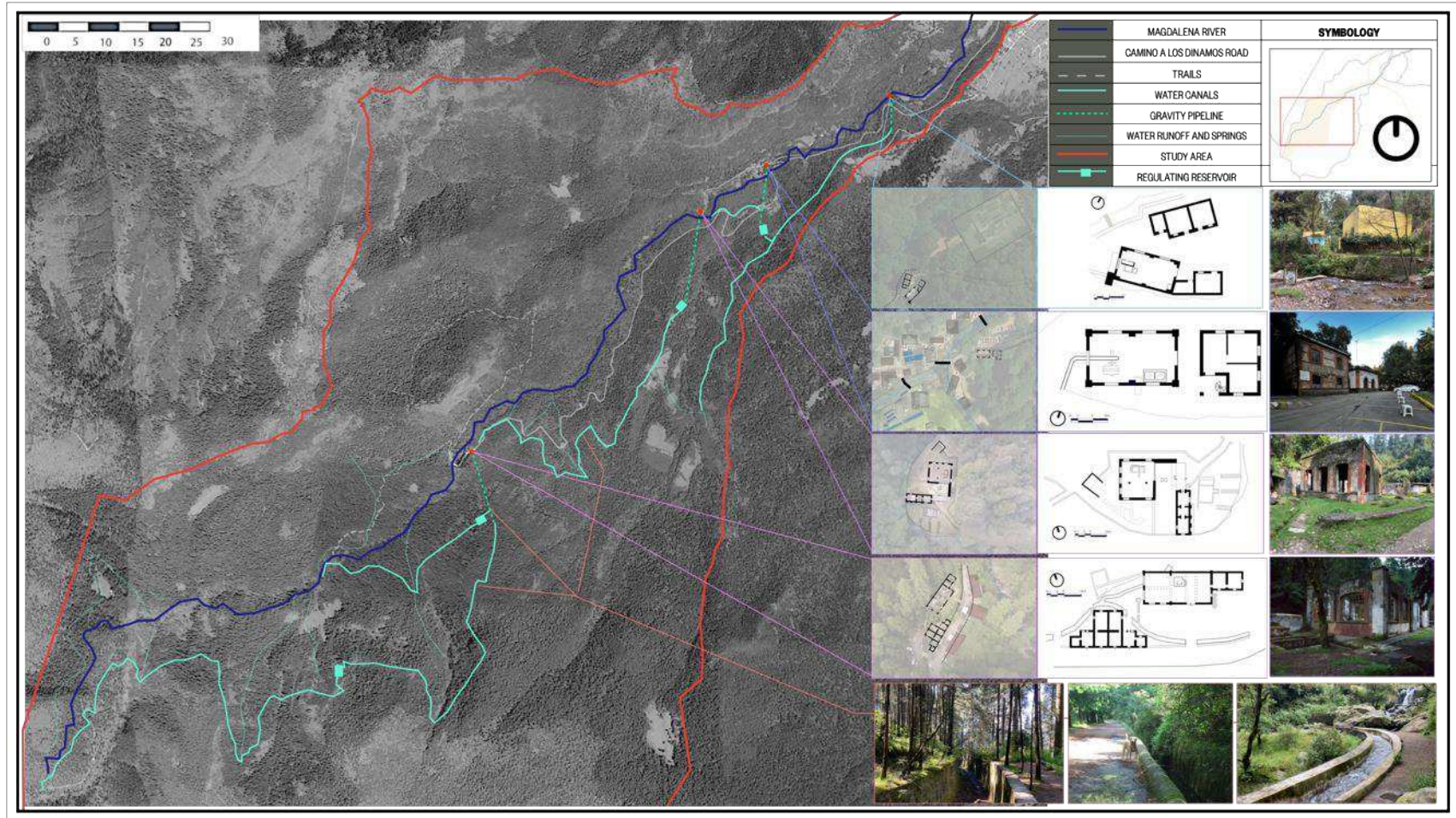
The remaining remnants of the complex made up of the four former power plants correspond to approximately 4,978 m<sup>2</sup> of constructed area and approximately 14.44 linear km of canals within the polygon (Figure 51).

In addition to the infrastructure of the canal system and the remnants of the *Dinamos* that will be detailed shortly, the complex is currently made up of the general infrastructure that is installed today, including roads, trails, climbing trails, drainage; two toll booths, two information modules, truffle and bee farms, recreation area, camping areas, zip line, environmental education school, restaurants and food huts<sup>141</sup>, concentrating mainly these services between the second and fourth *Dinamo*.<sup>142</sup>

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<sup>141</sup> See Appendix 16.

<sup>142</sup> See Appendix 18.



**Figure 51. Configuration of *Los Dinamos*, the map shows the location, the architectural layout and photographs of the four buildings and infrastructure. Own elaboration. Satellite photography: Google Earth. Photographs: Elisa Angeles.**

**Figure 52. The four *Dinamos*.**



Upper left: one of the buildings of the First Dinamo; upper right: Second Dinamo; lower left: Third Dinamo; lower right: Fourth Dinamo. Source: Photographs by Elisa Angeles. November 2021.

Built mainly with brick and stone, in some parts still covered with lime-sand plaster and concrete roofs, located along the basin of the Magdalena River and with a rugged terrain profile due to its location in an area of ravines.

Their construction sought the best position to obtain the best hydraulic exploitation, even being located kilometers away from the factories to which they would provide energy, thanks to the new technologies that allowed long distance transmission to the receiving units. The construction of the *Dinamos*, therefore, being at such a distance from the industry, required in addition to the infrastructure and key buildings for a hydroelectric plant (the machine room, reservoirs, canals, pipes, aqueducts, floodgates, etc.) complementary spaces for administration and commissioning, such as guardhouses that were habitable for the operators.

**Figure 53. Infrastructure in *Los Dinamos*.**

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Upper left, regulating reservoir and hut near the *Tarumba*. Upper right: operator's hut on the fourth Dinamo. Lower left, dam of the third Dinamo. Lower right: regulating reservoir. Source: Photographs by Elisa Angeles. November 2021.

The kilometers of canals that were used (and are still used in a somewhat inconsistent manner, and in sections) to transport water to the turbines and generate electricity, have different characteristics. In the complex they are found varying in typology and depending on the topography of the terrain as well as the volumes of water:

Canals with curbs on both sides: These canals have raised curbs on both sides to contain the water and ensure that it flows through the main canal. The curbs can be made of concrete, compacted earth or a combination of materials. These canals are used when greater flow control is required and to prevent overflow.

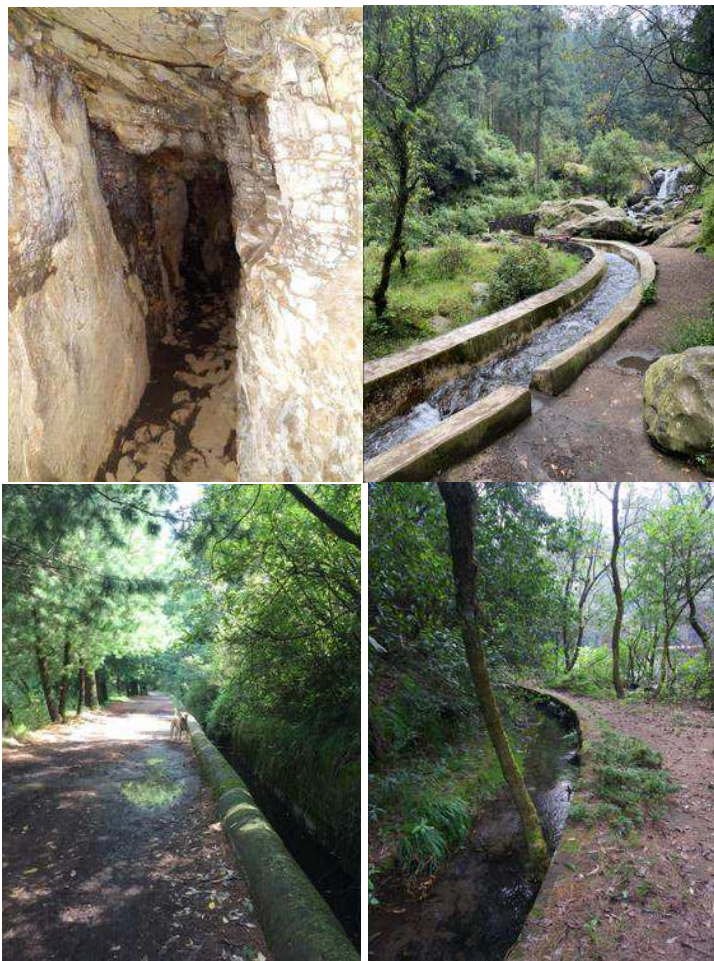
Canals with a bank on one side: In some cases, canals may have a single raised edge on one side, while the other side may be a gentle slope or support structure. This configuration is used when topography or terrain conditions do not permit the construction of banks on both sides. The raised edge helps to keep water in the canal and prevent it from overflowing.



Low canals: These canals are lower in height compared to curbed canals. They may simply be a shallow excavation in the ground or lined with water-resistant materials such as concrete or stone. These canals are used when water flow is lower or when the topography of the land does not require high banks.

Aqueducts excavated in stone: In this case, due to the type of mountainous and rocky terrain, a section of aqueduct carved in stone was built to transport the water. Its dimensions made it possible for one person to stand upright (60 to 170 cm).

**Figure 54. Canals and Aqueduct, typologies.**



Source: Photographs by Elisa Angeles. November 2021.

Other elements that allow the transport and control of water flow in the canals and that are appreciable are canals beds of compacted earth and concrete. The slopes (the side walls of the canal) are inclined and vertical with revetments, in some cases of concrete or stone that prevent erosion and improve the efficiency of water flow.

Along the canals there are also control elements such as gates, spillways, relief gates, water intakes, pipes, grates or canal screens, which worked together in the channelization system of the *Dinamos*.

**Figure 55. Elements of the channeling system of the *Dinamos*.**



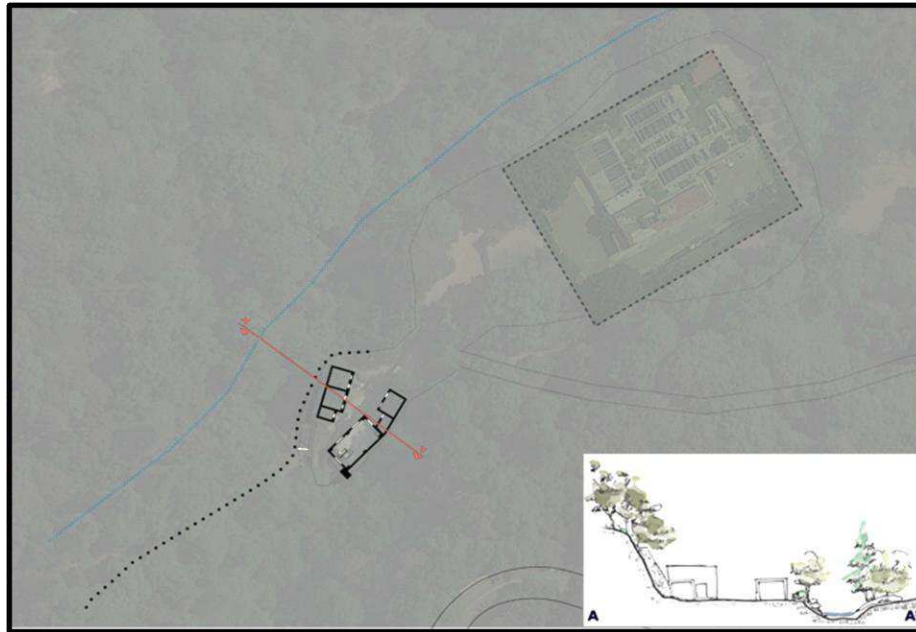
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Source: Photographs by Elisa Angeles. November 2021.

The first Dinamo buildings, located about 2,200 meters from the center of the town of La Magdalena, on the Camino a *los Dinamos*, on the right bank of the Magdalena River at an elevation of 2,680 meters above sea level. It is in front of the Magdalena Contreras water treatment plant of the *Sistema de Aguas de la Ciudad de México - SACMEX*, (Mexico City Water System), which is currently difficult to access from the main road detour. The area is fenced with cyclone mesh, which prevents access to the interior of the building, despite that it

looks well preserved. Despite this, due to its proximity to Parque de la Cañada, there is a continuous flow of walkers and cyclists along the river's edge towards the second Dinamo.

**Figure 56. Surroundings of the First Dinamo**



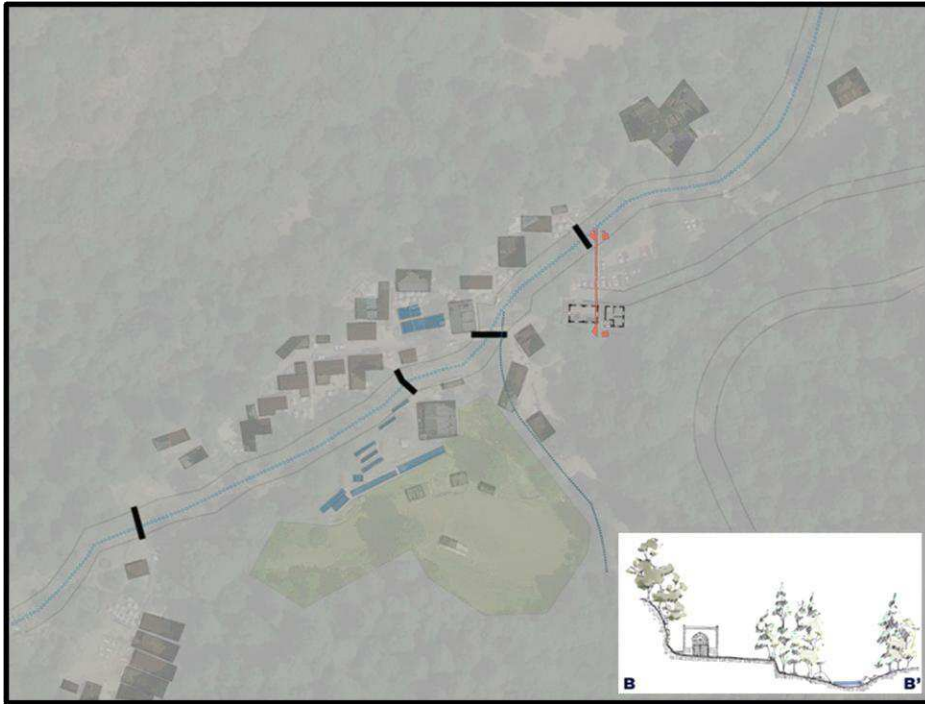
Light blue line, the Magdalena River, black dotted line, trail to second Dinamo. In the northeastern part of the image, the vicinity of the water treatment plant. Source: Own elaboration. Base image: Google Earth.

The well-preserved buildings of the second Dinamo are located on the right bank of the Magdalena River, specifically on *Camino a los Dinamos*, at cadence<sup>143</sup> 3+200, unnumbered at an elevation of 2,750 meters above sea level. It is located at a distance of 1,190 meters from the entrance to the First Dinamo and has its own turnoff from the main road. The immediate surroundings of the Second *Dinamo* cover approximately 5 hectares on the riverbank and offer a variety of facilities, such as food huts, aquaculture farms, recreation and leisure areas, as well as parking areas. During the survey, a total of 29 properties were registered in this area; however, in the table in Appendix 18, all of the properties registered in the area encompassing the four *Dinamos* are listed, giving a total of 55 businesses.

Figure 57 shows the connectivity on both sides of the river, which at that point has a width of about 7 meters and a maximum depth of 50 cm. Due to the services it offers, its proximity to the river current and the accessible trail routes, the second Dinamo is widely traveled by visitors.

<sup>143</sup> Cumulative distance, from a pre-established point of origin, along a trajectory, to another point.

**Figure 57. Surroundings of the Second Dinamo.**

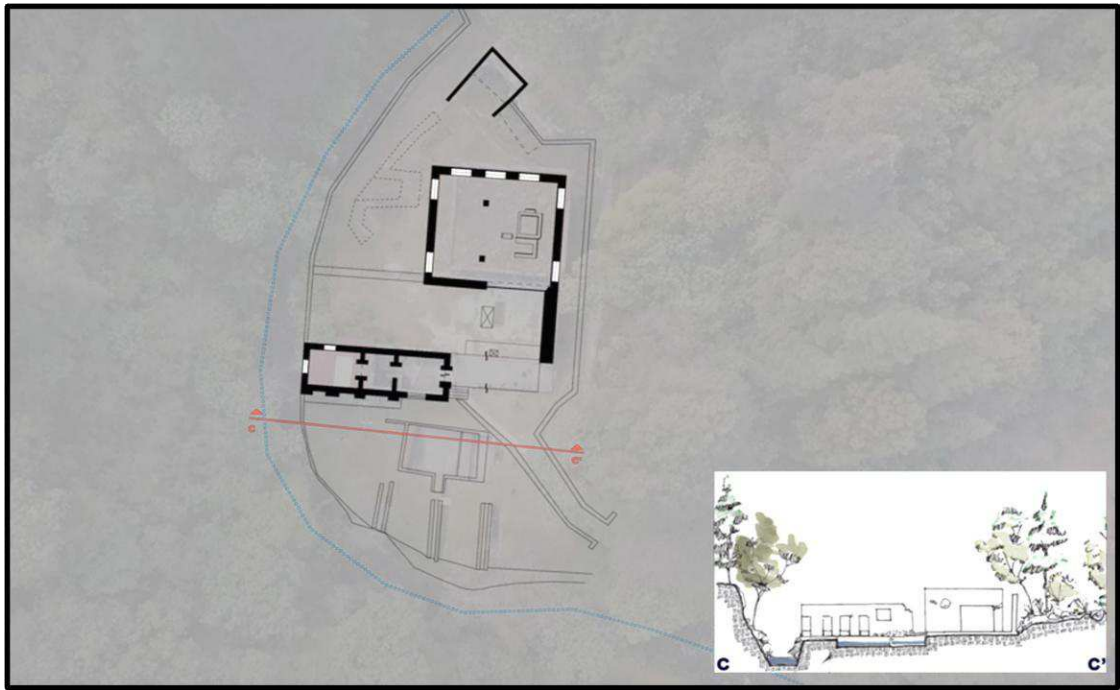


Light blue line, Magdalena River, dark blue, the canal. In brown, establishments, black, bridges and blue squares, aquaculture farms. Source: Own elaboration. Base image: Google Earth.

The ruins of the third Dinamo are located less than 600 meters from the second Dinamo, on the left bank of the river, following the main trail and at 2,800 meters above sea level, framed by the forest. Although it is not directly accessible from the road to the *Dinamos*, it is possible to reach the site by car via the trail, after paying an additional parking fee. It is worth noting that the third Dinamo is located near another area of food huts and aquaculture farms, along with the *Paidos* children's playground, which also serves as a toll booth for hikers and information for this new section of the forest.

In the vicinity of the third Dinamo, there are areas designated for activities such as campfires, camping and climbing, making it a popular destination. However, in the immediate vicinity of the third Dinamo, there is only one food shack and one parking area available. Also, on the Magdalena River at the height of the third Dinamo, a dam with three floodgates is formed. (See the photographic survey bellow, figure 64 to 67).

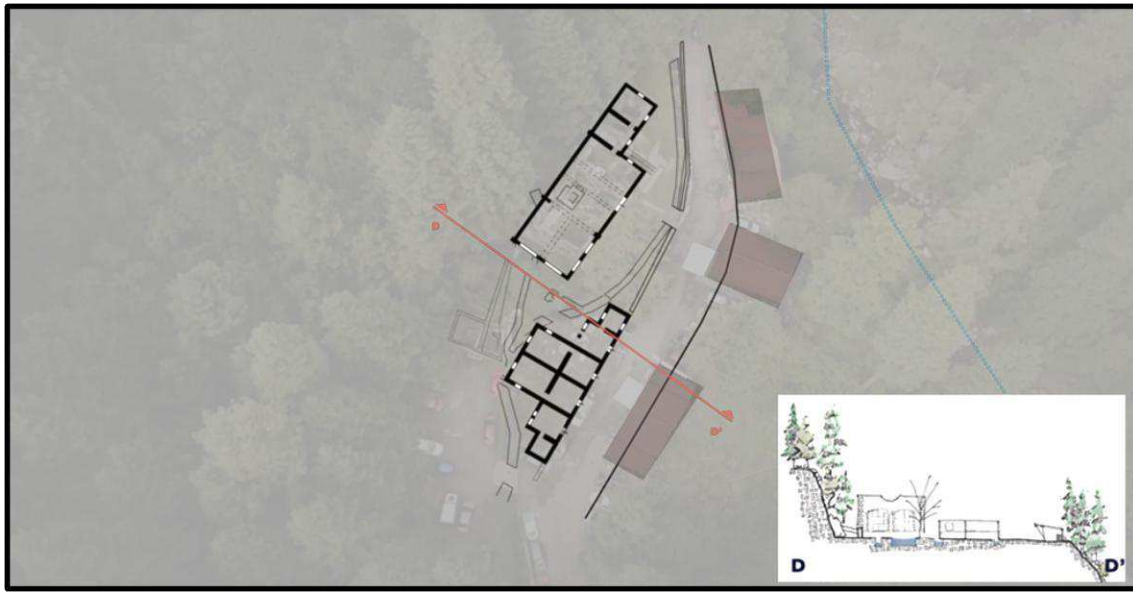
**Figure 58. Surroundings of the Third Dinamo.**



Light blue line, the Magdalena River. Source: Own elaboration, from: CharlyRarc. (2017). *Los Dinamos en la Ciudad de México, Ecoturismo de ciudad* [Image]. Recovered from <https://www.youtube.com/watch?v=3yMSm2Mlz1g&list=PLSTXMU0kMTz3tVLqjCLS5UZAawDBDV9PWI&index=17>

The fourth Dinamo, located on the right bank of the Magdalena River, three kilometers from the access to the second Dinamo, at cadence 5+950 and at an altitude of 3,100 meters above sea level, framed by the coniferous forest. offers in its surroundings activities ranging from pilgrimage to *Chalma*, in addition to the connections with the other parks (see appendix 16), climbing, hiking, mountain biking, zip-lining and again with its own food hut area.

**Figure 59. Surroundings of the Fourth Dinamo.**

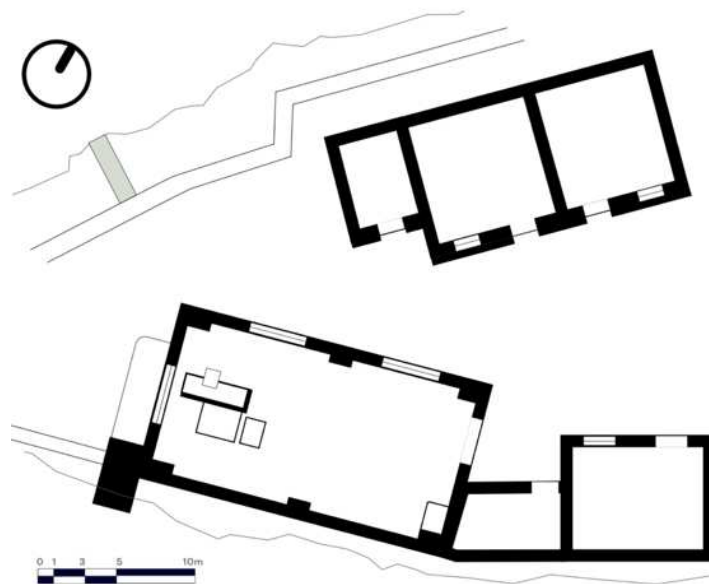


Light blue line, the Magdalen River. In brown, establishments. Source: Own elaboration, from: Hernández Jacobo, J. L. (2022). *Los Dinamos - alcaldía La Magdalena Contreras* [Image]. Recovered from <https://www.youtube.com/watch?v=GA0kjSVVseE>

*b. Architecture of Los Dinamos, spatial characteristics.*

1<sup>st</sup> Dinamo buildings

**Figure 60. 1<sup>st</sup> Dinamo Floor plan.**



Source: Own elaboration, from: Consulta Pública del Catálogo Nacional de Monumentos Históricos Inmuebles INAH.

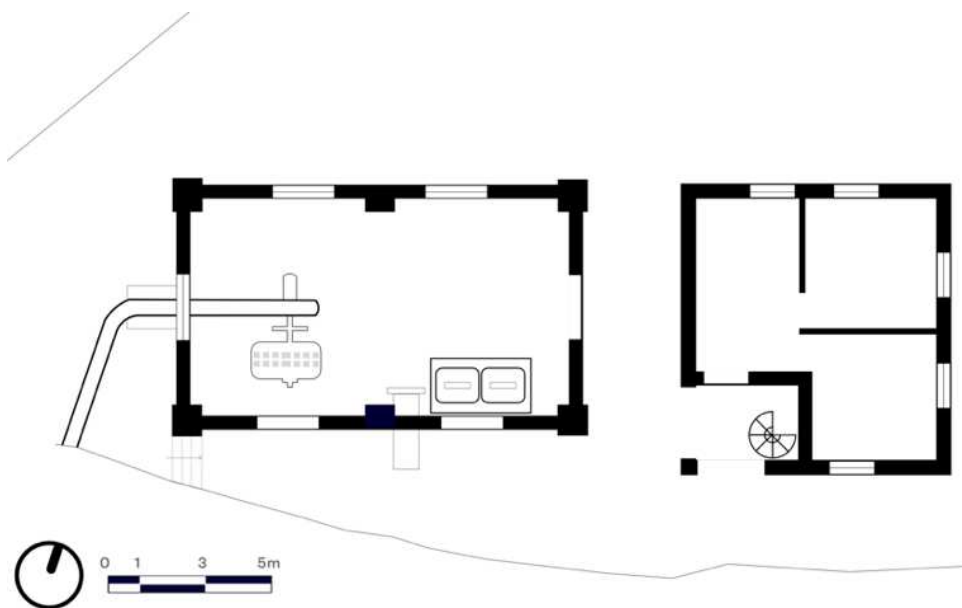
The first Dinamo consists of two buildings, one facing north and the other south. It is not known exactly what its interior looks like with accuracy, being *Figure 60*, a guess of the spaces. The configuration of the main volume is along three rooms, with the engine room being rectangular open plan.

Six access doors were identified, three on the north façade of the engine room building and three on the south façade of the north building. The main building, being leaning against the hillside, has a load-bearing wall with reinforcing pillars, and is of double height. The north building, of lesser height, corresponded to the caretaker's house and has rectangular openings, some with lowered arches.

Its roof is a flat concrete slab.

## 2<sup>nd</sup> Dinamo Buildings

**Figure 61. 2<sup>nd</sup> Dinamo Floor plan.**



Source: Own elaboration, from: Consulta Pública del Catálogo Nacional de Monumentos Históricos Inmuebles INAH.

The configuration of the main volume, the machine room, on the west side, is open plan, without internal divisions, being a large rectangular space. The building is double height, with a single access, on the east façade, having an opening of approximately 4.50 meters high, with

a brick semicircular arch, with iron folding doors. The illumination is provided by iron windows, present in almost all the exterior walls, with a total of five, framed in brick with lowered arch.

Its façade is made of white plaster, has brick corner columns and a perimeter cornice.

In its interior it conserves the original hydraulic machinery in exhibition, which has the inscription *Escher & Wyss No. 7680*, the transformer and the exit of the wiring. It is also currently used as a warehouse for street vendors who sell food in the vicinity.

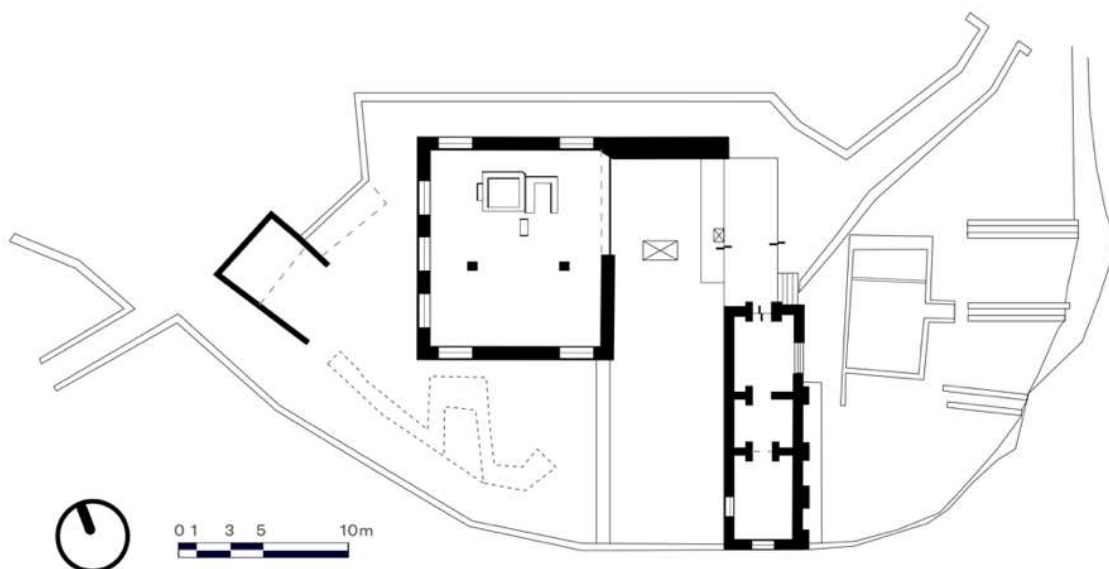
The roof is a vault of corrugated sheeting, probably of zinc (metal), supported on joists, which serves as a shingle for its flat roof on the exterior.

The building on the east side was the administration office rooms, with two levels and two access doors, one on the lower level and another one behind the spiral stairs on the second floor. It has few internal divisions that for the moment are preserved as a single open space in the absence of internal doors. This building has 6 openings on each floor.

The roof is new, of corrugated plastic sheeting, the floor of both buildings is of clay tile and white flattened.

### 3<sup>rd</sup> Dinamo buildings

**Figure 62. 3<sup>rd</sup> Dinamo Floor plan.**



Own elaboration, from: *Consulta Pública del Catálogo Nacional de Monumentos Históricos Inmuebles INAH.*



The third Dinamo is composed of three main volumes, and the water drainage area is partially in ruins. It is accessed from a cobblestone corridor. The walls are of stone masonry with flattened finish. Its roof is a slab and on concrete beams every 2m approximately.

The first volume in the northwest part, seems to have been used as stables, however it cannot be confirmed. Visible are also the outline of the other walls that composed it and the one in front of the machine room, marked with a dotted line in Figure 62.

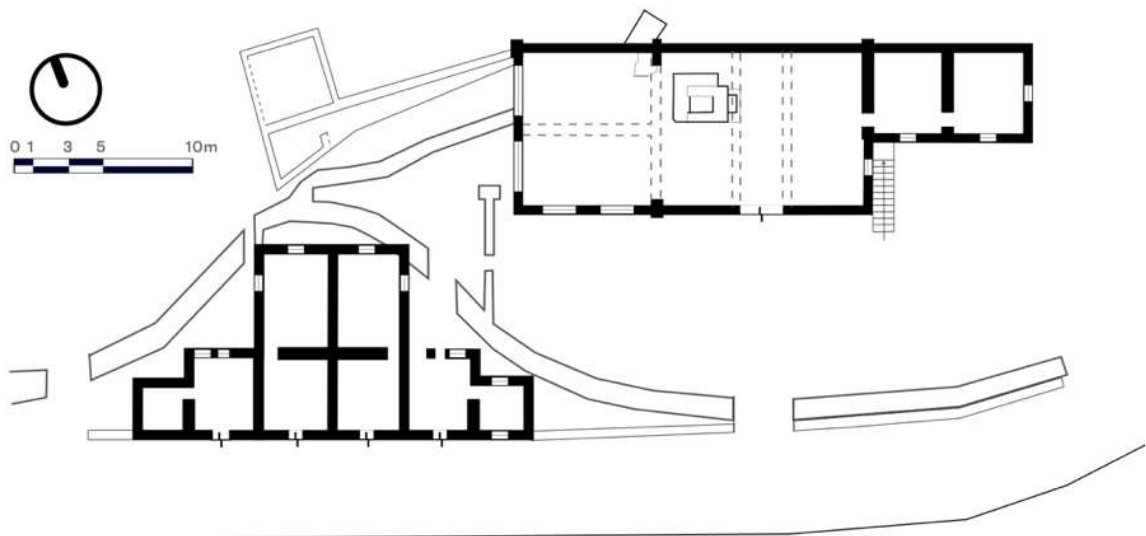
The building to the southeast, according to INAH, contained the foreman's quarters. Erected with brick walls of a height of 5 meters, with the wall on the eastern side supported by four buttresses in perfect condition. It has a cement floor and only the southernmost room has a flat concrete roof. It is currently used as a storage house.

The machine room, in the northern part of the figure, is also double height, about 5 meters. You can still see the cemented spaces in the floor for the machinery. Its access is large and rectangular in shape, similar to a lintel arch, and is located on the east façade. A total of six large arched openings with lintels and red partition walls along the north, west and south facades. This building retains part of its mosaic floor. The north wall extends to the exterior limiting the access area to the complex, which is in poor condition.

The stream outlet area still contains water despite the fact that part of its canals has been filled in or partially destroyed.

#### 4<sup>th</sup> Dinamo Buildings

**Figure 63. 4<sup>th</sup> Dinamo Floor plan.**



Source: Own elaboration, from: Consulta Pública del *Catálogo Nacional de Monumentos Históricos Inmuebles* INAH.

The Dinamo room is composed of a perimeter wall with the main access being a bridge over a canal parallel to the perimeter wall and two buildings: the machinery building to the northeast, with the water drainage area on the west side and the southwest building on the perimeter wall.

The configuration of the machine room is rectangular with two rooms and double height in the case of the main room, while the second room has dividing walls and a second level in ruins with what was a room with a wooden roof, accessible from the outside by means of a very ruinous staircase on the far right. Three access doors to the main building were identified, on the south façade in front of the main access on the *Camino a los Dinamos* road and others in the room on the side, on the lower and upper floor. The stone walls with flattened finish and stone corner enclosures, with openings for the water fall pipe to the turbines still visible. The illumination of the building was by means of four structural iron windows, with lowered arches and red brick lintels.

Its roof was of concrete with steel joists visible today.

The building on the south side, also with stone walls and brick corners, consists of a main body, with divisions to possibly house two rooms for workers, a cellar, a kitchen with a fireplace, and a bathroom. Its roof is of concrete slab in poor condition. The building has an overhang over the machine room drainage canals.

The floors in both buildings are tiled and are especially well preserved in the south building. The overflow canals, connected to a basin, are concrete.

















### *c. Photographic survey*

The following photographic survey seeks to reinforce the architectural description and to be material that supports the diagnosis of the state of conservation.

It consists of four tables each with a selection of the photographs taken during the 2021 visits, between October and November.

The tables present photos of the surroundings of the *Dinamos*, external and internal views of the buildings, as well as specific details.













**Figure 64. Photographic survey 01– Environment -. Date: 2021.11 and 10. Photographs by Elisa Angeles**

<i>1<sup>st</sup> Dinamo</i>	<i>2<sup>nd</sup> Dinamo</i>	<i>3<sup>rd</sup> Dinamo</i>	<i>4<sup>th</sup> Dinamo</i>
			
Concrete weir and floodgates	Food huts	Natural waterfall	Water canal to 4th Dinamo
			
River stone stairs	Road to third Dinamo	Third Dinamo Bridge and water canal	4th Dinamo Reservoir
			
Water treatment plant roughing system	River Stream and wooden bridge	Weir and 3rd Dinamo main gate.	View from the forest to the 4th Dinamo
			
1st Dinamo and the Magdalena River.	Food huts towards third Dinamo	Stone walls of a weir	View of spillway canals and buildings 4th Dinamo

**Figure 65. Photographic survey 02– External views-. Date: 2021. 11 and 10. Photographs by Elisa Angeles**

<i>1<sup>st</sup> Dinamo</i>	<i>2<sup>nd</sup> Dinamo</i>	<i>3<sup>rd</sup> Dinamo</i>	<i>4<sup>th</sup> Dinamo</i>
			
View of the possible engine room.	View of the piping connected to the turbine	View of the south facade of the engine room and ruins.	Main entrance
			
North building	View of the buildings from the parking lot	View of the east building and its buttresses	View from the road to the south façade of the southwest building.
			
Cyclonic mesh of the first Dinamo	View of the south façade of the east building.	View of the access and the water drainage area.	View of the west facade of the machine room.
			
Bearing wall buttresses	View of the south facade of the machine room.	View of the access corridor	View of the east facade of the machine room. The stairs are visible.

**Figure 66. Photographic survey 03– Internal views -. Date: 2021.11 and 10. Photographs by Elisa Angeles**

<i>2<sup>nd</sup> Dinamo</i>	<i>3<sup>rd</sup> Dinamo</i>	<i>4<sup>th</sup> Dinamo</i>
		
<p>Inside the machine room, the transformer and the metallic vault are visible.</p>	<p>Inside machine room, view towards west wall.</p>	<p>Inside machine room, visible old location of turbines.</p>
		
<p>Inside machine room, turbine view. Can be appreciated how food stands are stored.</p>	<p>Inside machine room, view towards south wall.</p>	<p>Interior machine room, east facing.</p>
		
<p>View towards the machine room access</p>	<p>View of the room in the southeast building from the corridor.</p>	<p>Room with chimney, south building.</p>
		
<p>View of the south wall of the machine room.</p>	<p>Photograph of the turbine model of the third Dinamo.</p>	<p>Access to the room next to the machine room.</p>

**Figure 67. Photographic survey 04– Details -. Date: 2021.11 and 10. Photographs by Elisa Angeles**

<i>2<sup>nd</sup> Dinamo</i>	<i>3<sup>rd</sup> Dinamo</i>	<i>4<sup>th</sup> Dinamo</i>
		
<p>Detail of the roof, a vault of corrugated sheeting.</p>	<p>Detail of the cemented spaces in the floor for the machinery.</p>	<p>Detail of the lintel and chain, in the access door to the southwest building.</p>
		
<p>Output terminal of the electricity distributor.</p>	<p>Roof of the 3rd Dinamo, concrete slab</p>	<p>Detail of the channel between the fence surrounding the 4th Dinamo.</p>
		
<p>Turbine and generator of the second Dinamo.</p>	<p>Detail of the walls, where the ashlar in the corners of the wall and the red brick spans can be seen.</p>	<p>Detail of the piping connecting the water fall to the turbines</p>
		
<p>Detail of the inscription on the side of the turbine. Escher Wyss &amp; CIE No. 7680</p>	<p>In the photo you can see the thin concrete column and in the background the turbine model.</p>	<p>Pipeline discharging water into the reservoir</p>

*d. Diagnosis and condition of conservation*

Thanks to the field visits and the photographic study, it was possible to observe the different conditions of each property. On the one hand, two of the four *Dinamos* are in good architectural condition (the first and second) and the other two have a high level of degradation throughout.

The metallic structural elements that have been exposed show signs of oxidation in iron fittings and lack of fixation in some points, as in the stairs of the second *Dinamo*, which are dangerous to use.

The roof again in the case of *Dinamos* 3 and 4, as well as the east building of the second *Dinamo*, show in the case of 4, in the engine room building a total disappearance, in the case of the second of the third, the same vegetation cover and in the case of the second, wear of the plastic material.

The masonry of *Dinamos* 3 and 4 are almost entirely covered by various types of efflorescence and lichens due to their uncovered state, both on the interior and exterior walls. Likewise, several parts of the wall coverings are detached or in the process of crumbling. Surprisingly, the parts bordering the forest or trees do not show any lifting or damage to the structures, only the predominant vegetation cover on the less protected elements.

In these third and fourth *Dinamo* there is a special lack of constructive material that has been extracted, highlighting the brick and stone of the walls, as well as the collapse or filling of gutters.

The openings that were not structural, as in the case of the third *Dinamo* have disappeared in their totality. Those with structural ironwork, as in the case of the second and fourth, are still preserved, with varying degrees of oxidation.

In the case of the floor, again the state of the interior of the first *Dinamo* cannot be confirmed, but it is speculated that like the rest of the building it is in good condition. Likewise, the second *Dinamo*. The third and fourth *Dinamo*, conserve fragments of the original mosaic, but the concrete and the vegetation and microflora predominate.

With respect to the ornamentation there are broken, crumbled and missing parts in cornices and frames.

In general, the canal system is in good condition. It is noted that there has been material removal, especially of sluice gates and pipes in the canals, but they remain in use in sections.

#### IV. Conclusions and final considerations of Chapter III

The industrial landscape of the Magdalena River has significant historical and cultural value, as it reflects the identity of the settlements that developed in the area over time. Although some elements have disappeared, they have left a mark on the physical, social and cultural environment.

From the first *obrajes* and fulling mills to the last textile factories, the progress of technology and industrial activity in the territory has been evident. As shown in Figure 28 and Table. 6, several industrial elements that are still preserved have been catalogued as heritage.

These material and immaterial traces are present in the architecture, infrastructure and urban environment, with multiple adaptations and new uses. On the one hand, we find roads that adopt the name of industrial elements, and shopping centers that, thanks to their industrial architecture, create identifying spaces. In addition, some of these factories have become places of study and are valued by the local and foreign community.

The industrial landscape is present in urban areas as well as in green areas. Especially in the section of *Los Dinamos*, there is an undeniable aesthetic and landscape value.

Efforts have been made to give heritage an educational and didactic value, as well as to take advantage of its potential for sustainability and adaptive use. An example of this is the case of *the Foro Cultural Magdalena and the Casa de las Bellas Artes Juventino Rosas*, which use industrial heritage as tools for culture and education. In the *Parque de los Dinamos*, guided walks are organized for educational and environmental purposes for visitors. However, it is necessary to seriously consider the preservation of its elements, adopting an approach that allows a sustainable reuse compatible with the protection of its historical and cultural value.

This area is a center of leisure and tourism in the city, generating income for the local population and being the main attraction of the municipality, visited by tourists and sportsmen. Therefore, it has great potential and has the interest of local, private and governmental stakeholders in its development.

In summary, this chapter has made it possible to clearly present the state of industrial heritage in the Magdalena River system, highlighting that each state implies different approaches and challenges in terms of conservation, management and use. The valuation and



conservation of industrial heritage in its various states contribute to the understanding of industrial history, cultural identity and sustainable development.

There are cases of heritage as in the case of the *Santa Teresa* factory, *Puente de Sierra* or *La Hormiga* where, now the heritage rather than material (although there are vestiges) becomes rather immaterial and remains in the memory of the inhabitants, a subject that I will elaborate in more detail in the next chapter.

Other cases where there is a presentation of this industrial heritage but in a way that does not include the system and the importance and development that it had since the first settlements in the area, which should be considered according to the principles mentioned and that give consistency and basis to the heritage.

The realization of the photographic and architectural survey of the *Dinamos* allowed us to know both the historical and technical aspects of their construction and operation and also made it possible to point out their current physical state and, if taken into account, the elements that deserve more attention in a future process of intervention and conservation of the property.

## **Chapitre IV. Préservation du patrimoine industriel :**

### **Acteurs, juridiction et rezonage des paysages industriels.**

#### Résumé

Comme vu dans les chapitres précédents, le paysage industriel du fleuve Magdalena a été présenté non seulement comme un patrimoine, mais aussi comme une partie précieuse de l'histoire et de la culture de la région, témoin du passé et élément fondamental du développement économique et du progrès technologique. Cependant, la préservation de ce patrimoine fait aujourd'hui face à de nombreux défis. Dans ce chapitre, nous explorerons le rôle fondamental des acteurs institutionnels dans le processus de préservation du patrimoine industriel, ainsi que l'importance d'avoir des outils juridiques, de protection et légaux solides pour garantir sa conservation. Dans la première partie de ce chapitre, nous analyserons les principaux acteurs impliqués dans la préservation du patrimoine industriel au Mexique. Des organismes gouvernementaux et des agences spécialisées aux organisations à but non lucratif, en passant par les groupes communautaires, nous étudierons leur rôle dans l'identification, la protection et la promotion de ces espaces historiques. La deuxième partie examinera la juridiction, la protection et les outils juridiques pour la préservation du patrimoine industriel. Les lois et réglementations existantes au Mexique seront analysées, ainsi que les mécanismes de protection mis en place pour sauvegarder ce patrimoine industriel. Enfin, dans la troisième partie, nous aborderons la question de la possible réaffectation des Dinamos et des éléments restants du paysage industriel de la rivière Magdalena. Nous analyserons les stratégies et les approches qui peuvent être mises en œuvre pour revitaliser ces paysages abandonnés, en cherchant à les adapter à de nouvelles fonctions, telles que des espaces culturels, récréatifs ou commerciaux, tout en préservant leur valeur historique et culturelle, et des propositions seront explorées pour la sauvegarde et la valorisation du paysage industriel.

## Chapter IV.

# Industrial Heritage Preservation: Actors, Jurisdiction and Rezoning of Industrial Landscapes.

As seen during the past chapters the, the Industrial landscape of the Magdalena River, has been presented not only as heritage but also as a valuable part of the region's history and culture, witness to past and a fundamental part of economic development and technological progress. However, the preservation of this heritage faces numerous challenges today. In this chapter, we will explore the fundamental role of institutional actors in the process of preserving industrial heritage, as well as the importance of having a solid jurisdiction, protection and legal tools to guarantee its conservation.

In the first part of this chapter, we will analyze the key actors involved in the preservation of industrial heritage in Mexico. From government bodies and specialized agencies to non-profit organizations or community groups and the role they play in the identification, protection and promotion of these historic spaces.

The second part will examine the jurisdiction, protection and legal tools in the preservation of industrial heritage. The existing laws and regulations in Mexico will be analyzed, as well as the protection mechanisms that have been established to safeguard industrial heritage.

It will also explore comparatively the legal tools available in France, UNESCO's host country, to encourage preservation, such as the designation of protected areas and the granting of tax incentives. The comparison of legislation and the case study of industrial heritage with France is justified in the first place, because it has a long tradition in the preservation and management of industrial heritage, with specific legislation and policies for its protection. Secondly, the comparison with France through the analysis of its legislation and case studies allows the identification of good practices and successful strategies in the preservation of industrial heritage.

Finally, in the third part, we will address the question of the possible rezoning of *Los Dinamos* and the remaining elements of the industrial landscape of the Magdalena River. We will analyze the strategies and approaches that can be implemented to revitalize these abandoned landscapes, seeking their adaptation to new functions, such as cultural, recreational or commercial spaces, without losing their historical and cultural value.

## **I. The institutional actors in the process of regulation, urbanization and preservation of industrial heritage**

### *a. Overview of Mexico's current political system*

Before delving into the specific aspects of the industrial landscape within the municipality, it is important to provide a brief overview of Mexico's current political system. This contextual information will help us better comprehend the cultural and heritage management challenges associated with the territory.

Mexico operates under a federal republic system, based on a presidential democracy composed of 32 states, where power is divided between the federal government and the individual states. The division of powers at the federal levels is divided very similar to France<sup>144</sup>, with a legislative, executive and judicial branch. Mexico's executive power resides in the figure of the country's president, who has a constitutional term of six years, with no possibility of re-election<sup>145</sup>. Currently, President Andrés Manuel López Obrador is in power since 2018 and his presidential term will end in 2024. The Mexican legislative power is held by the Congress of the Union, which is divided into two chambers: the Chamber of Deputies and the Senate of the Republic<sup>146</sup>. In terms of national legislation, the country legislates through laws developing the precepts of the Political Constitution of the country of 1917<sup>147</sup>, as well as the regulations that govern the application of the laws, and the norms that specify the characteristics of the latter.

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<sup>144</sup> France operates under a semi-presidential republic political system. It is characterized like Mexico by a separation of powers between the executive, legislative, and judicial branches of government. The President of France serves as the head of state, elected by vote for a five-year term, and holds the executive power, they appoint the Prime Minister, that heads the is responsible for implementing policies. The legislative branch consists of a bicameral parliament, which includes the National Assembly and the Senate. The judiciary in France is independent and operates under a civil law system. France similar to Mexico, has a system of local government, with administrative divisions including regions, departments, and municipalities. These local authorities have varying degrees of autonomy and responsibilities in managing local affairs, including land use planning and cultural heritage preservation.

<sup>145</sup> The president is both head of state and head of government and is also the supreme commander of the armed forces. In addition, he appoints the cabinet.

<sup>146</sup> The Chamber of Deputies has 500 deputies, of whom 300 are elected by universal suffrage and 200 by proportional representation, for a three-year term. The Senate of the Republic is composed of 128 members, 96 of whom are elected by direct suffrage and 32 by proportional representation, for a term of six years.

<sup>147</sup> Referring to the Political Constitution of the United Mexican States, published in the Official Gazette on February 5, 1917 and updated until the last constitutional amendment on June 20, 2005. This Constitution is the fundamental law that establishes the essential rights and obligations of citizens. In the area of heritage and cultural management, it is important in its application and use.

After the federal government, Mexico has the States, each of them has its own government led by a governor. State governments have legislative and executive branches that operate similarly to the federal level, with state congresses and governors responsible for state affairs and legislation. And secondly the Municipal Governments: Municipalities are the local administrative units within each state. They are governed by municipal presidents or mayors and have their own municipal councils. Municipal governments have jurisdiction over local matters, such as urban planning, public services, and local regulations. Mexico with its federal system in which states and municipalities have greater autonomy in decision-making and management of local affairs.

Knowing this political framework is important to grasp the complexities and interplay between different actors involved in the preservation of industrial heritage in Mexico, in order to better understand the legal stakes and the applications on the ground of these protection measures.

**Table 7. The main actors and laws, heritage standard-setting authorities in Mexico**

The main actors and laws, heritage standard-setting authorities in Mexico City		
<i>Instituto Nacional de Antropología e Historia</i> – INAH, (National Institute of Anthropology and History) <i>Instituto Nacional de Bellas Artes y Literatura</i> - INBAL (National Institute of Fine Arts and Literature)	Secretaría de Desarrollo Urbano y Vivienda de la Ciudad de México (SEDUVI)	Municipalities
Appointed by the Art.44-45 of the <i>Ley Federal sobre Monumentos y Zonas Arqueológicas, Artísticas e Históricas</i> , (Federal Law on Monuments and Archaeological, Artistic and Historical Areas.)	Appointed by the Art.27 of the <i>Ley de Desarrollo Urbano del Distrito Federal y 66 del Reglamento de la Ley de Desarrollo Urbano</i> . (Mexico City Urban Development Act and 66 of the Urban Development Act Regulations.)	Appointed by the Art.7 of <i>Reglamento de Construcción de la Ciudad de México</i> , (Mexico City's Building Regulations).
The laws that regulate and protect heritage in Mexico City are:		

- Ley de Patrimonio Cultural, Natural y Biocultural del Distrito Federal, (Mexico City Cultural, Natural and Biocultural Heritage Act.)
- Ley de Desarrollo Urbano del Distrito Federal, (Federal District Urban Development Act.)
- Ley Federal sobre Monumentos y Zonas Arqueológicas, Artísticas e Históricas*, (Federal Law on Archaeological, Artistic and Historical Monuments and Areas.)
- Reglamento de Construcción de la Ciudad de México (Mexico City Building Regulations.)

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**Own elaboration from: DOF, *Ley Federal sobre Monumentos y Zonas Arqueológicas, Artísticas e Históricas*, last reform published: 2018; GOCDM, *Ley de Desarrollo Urbano de la Ciudad de México*, last reform published: 2021; and GOCDM, *Reglamento de Construcciones de la Ciudad de México*, last reform published: 2021.**

*b. Federal and State Actors in the management of heritage and cultural policies in Mexico*

First of all, at the national level, various institutions intervene in the cultural and heritage sphere, which can have an impact on the heritage present in the municipality. The political context in Mexico differs from the French political system, and the territorial structure is associated with the management policies implemented at the federal level.

At the federal level, the *Instituto Nacional de Antropología e Historia* (INAH) an autonomous institution in Mexico that operates independently under the Secretary of Culture. plays a crucial role in the preservation and safeguarding of cultural heritage, including industrial sites of historical significance. INAH is responsible for the identification, protection, and promotion of Mexico's cultural assets, ensuring their conservation for future generations.

The INAH was founded in 1938 by the Secretary of Public Education, and has its own funds and legal personality, meaning that it has the legal capacity to carry out its functions, manage its resources, and make decisions independently, within the framework of the laws and regulations that govern its operation. Its main objective is to preserve, study and disseminate the archaeological, historical and artistic heritage present in Mexico. Each of these types of heritage has a temporal referent, that is to say that the archaeological heritage is situated from the origins of human occupation until the Spanish Conquest of 1521, the historical heritage from the Conquest until the end of the 19th century, and the artistic heritage since the beginning

of the 20th century<sup>148</sup>. The temporal categorization of heritage, with different periods for archaeological, historical, and artistic heritage, is a characteristic of the INAH's approach to managing and preserving these types of heritage. This temporality associated with a specific type of heritage has resulted in the institutionalization of links between archaeological science and architectural restoration, which puts archaeological heritage as a priority over other types of heritage, like the industrial heritage.

The INAH plays a crucial role in the management of cultural heritage in Mexico but does not have a monopoly on heritage management. While federal law grants the INAH with significant authority and competence in research and conservation, there are also other institutions, organizations, and stakeholders involved in heritage at the federal level, such as the Secretariat of Culture<sup>149</sup>, known before as the *Consejo Nacional de la Cultura y las Artes* – CONACULTA, (National Council for Culture and the Arts); and the *Instituto Nacional de Bellas Artes y Literatura* – INBAL, (National Institute of Fine Arts and Literature), which contribute to the preservation and promotion of cultural heritage in Mexico. This last one, the INBAL, in comparison to the INAH, is more interested in the promotion of artistic production, dissemination of the arts and literature. The Secretariat of Culture, responsible for formulating and implementing cultural policies at the national level, provides overall guidance and support to various cultural institutions, like the INAH, due the align goals and activities with the national cultural policies and priorities set by the Secretariat. Nowadays its headed by Alejandra Frausto Guerrero.

When it comes to industrial heritage specifically, the INAH does have a significant role in its management and conservation in Mexico. It is this institution that has a catalog of the properties listed as heritage, which is well updated and easy to consult. However, it is important to note that the responsibility for industrial heritage is not solely limited to the INAH.

International organizations like International Council on Monuments and Sites (ICOMOS), International Center for the Study of the Preservation and Restoration of Cultural Property (ICCROM) or the International Committee on Archeological Heritage Management (ICAHM),

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<sup>148</sup> García Nelly, Corbett Jack, « Heritage Resource Management in Mexico », in *Cultural Heritage Management: a global perspective*, University Press of Florida, 2011, chap. 8, p. 2.

<sup>149</sup> One of the nineteen ministries of state.

operate independently, through its national committee and collaborate with various institutions and stakeholders around the world, including the INAH.

Moreover, other organizations that participate in highlighting industrial heritage, at the federal level are *The International Committee for the Conservation of the Industrial Heritage* (TICCIH) Mexico<sup>150</sup> and the *Comité Mexicano para la Conservación del Patrimonio Industrial A.C-* CMCPI (Mexican Committee for the Conservation of Industrial Heritage)<sup>151</sup>, which invites discussion and visibility of this type of heritage in the country, concentrating efforts on the protection of industrial, mining and railroad assets. TICCIH Mexico is considering the establishment of a list of industrial heritage: in our case, the industrial landscape of *Los Dinamos* could be registered as an industrial property. This type of list is not yet officially established, but it participates in highlighting this type of heritage in the eyes of the country's policy management actors.

The Secretariat of Tourism in Mexico and its links and connections with the Secretariat of Culture, promotes and developpes the country cultural and tourism sectors.

While the Secretariat of Culture primarily focuses on cultural heritage preservation, arts, and cultural policies, the Secretariat of promotes the cultural tourism as part of the overall tourism industry, and both secretariats recognize the value of cultural heritage in attracting tourists and fostering sustainable tourism. Often collaborating on projects and strategies that aim to highlight Mexico's cultural richness and heritage sites as tourist attractions, like the “Magic Towns”<sup>152</sup> designation. Making collaborations that involve joint marketing campaigns, cultural events, heritage site development, and the promotion of cultural tourism routes and itineraries.

Now in a state level, our study case, being part of Mexico City<sup>153</sup>, according to the Law of Cultural, Natural and Biocultural Heritage of Mexico City<sup>154</sup>, the competent state actors in

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<sup>150</sup> *The International Committee for the Conservation of the Industrial Heritage of Mexico*. TICCIH was formally created in 1978, Incorporated in Mexico in 2006. Chaired by José L. García Rubalcava

<sup>151</sup> Comité Mexicano para la Conservación del Patrimonio Industrial A.C. a Civil Association founded in 1995.

<sup>152</sup> "Pueblo Mágico" (Magical Town) is a designation given to certain towns or communities in Mexico that have been recognized for their cultural, historical, and natural significance, with the aim of promoting tourism and preserving the country's cultural heritage.

<sup>153</sup> Mexico City, formerly known as the Federal District, as of 2015, many of the legal documents that have not been updated to date are still in effect even though "Gobierto del Distro Federal" GODF is used.

<sup>154</sup> Gaceta Oficial de la Ciudad de México, *Ley de Patrimonio Cultural, Natural y Biocultural de la Ciudad de México*, Last amendment published in the G.O.CDMX October 27, 2022



charge of heritage management are the *Secretaría de Cultura de la Ciudad de México* (Secretariat of Culture of Mexico City), the *Secretaría de Desarrollo Urbano y Vivienda - SEDUVI* (Secretariat of Urban Development and Housing), the *Procuraduría Ambiental y del Ordenamiento Territorial – PAOT* (Environmental and Land Management Attorney's Office), the INAH and INBAL.

Returning to INAH, its National Coordination of Historic Monuments (CNMH-INAH), was the one who elaborated the national catalog of historic monuments, within which properties of various historical periods were catalogued by municipal entity.

While the Secretariat of Culture of Mexico City, is responsible for formulating and implementing cultural policies at the city level. It plays a key role in the preservation and promotion of cultural heritage within Mexico City, including supporting cultural events, museums, the SEDUVI, is involved in urban planning and development in Mexico City, cataloging and collaborating with other institutions (like the INAH) to ensure that heritage considerations are taken into account in urban development projects, zoning regulations, and land-use planning. SEDUVI then, is in the city, an authority responsible for the delimitation of neighborhoods, point that I must emphasize and should be taken into consideration. Lastly but not least, the PAOT, that shares information related to the heritage to the population and exchanges information on permits or authorizations issued for interventions or construction licenses in listed buildings, with municipalities and institutions like INAH, INBAL or SEDUVI, receiving complaints, verifying them and sanctioning if necessary, being an active protector of the patrimony.

Now, these actors manage and preserve specific properties or also cooperating in the generation of plans and politics like the *Programa General de Desarrollo Urbano - PGDU* (General Urban Development Program)<sup>155</sup>, the *Programas Parciales de Desarrollo Urbano - PPDU* (Partial Urban Development Programs), the *Normas Generales de Ordenación* (General Ordinance Standards)<sup>156</sup>, among others. Plans and policies such as these involve larger areas, and delimit land uses, allowing the establishment of uses and destinations aimed at the conservation and preservation of historic and heritage areas, such as some historic city centers

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<sup>155</sup> *Programa General de Desarrollo Urbano* updated in 2016.

<sup>156</sup> *Normas Generales de Ordenación* updated in 2015

like Mexico City or Puebla, where this not only a single building but broader heritage areas are considered<sup>157</sup>.

c. *The actors of management of heritage and cultural policies in Magdalena Contreras*

The actors of heritage management within the municipality are different coordination poles established at the local level to manage the municipality's heritage, mostly a mixture between the state level institutions and the very local departments.

In the municipality of *Magdalena Contreras*, the *Dirección General de Obras y Urbanismo* (General Department of Works and Urban Development) and the *Coordinación de Cultura y Patrimonio* (Coordination of Culture and Heritage), are the entities responsible for handling various matters and maintaining direct dialogue with stakeholders in the community.

The later, sets up programs for culture and promotion of the arts, its objective being to design a cultural policy according to the needs of the inhabitants and diversifying cultural and artistic expressions with a vision of tradition in heritage. This coordination is itself subdivided into three parts, including the departmental head of unit of cultural heritage, the departmental head of unit of cultural promotion and community linkage, and finally the departmental head of unit of cultural places.

Local heritage management actors in Magdalena Contreras are also interested in combining the field of tourism with heritage and culture at the local level, as evidenced by the municipality's participation in the *Sonríe por tu Ciudad* (Smiles for Your City) program, implemented by the Secretariat of Tourism of Mexico City, which aims to bring its tourism offer closer, providing tourist tours to the population of Mexico City. In 2016, the head of the municipality of Magdalena Contreras, Fernando Mercado Guaida, signed a collaboration agreement with the Secretariat of Tourism to attract a greater influx of tourists to the historical, cultural and recreational spaces of the municipality, of which *Los Dinamos* is one<sup>158</sup>.

There is an awareness on the part of these public authorities on the potential but there is a need to value and protect the heritage, in order to establish a symbolic territorial identity through the public space, at the level of the municipality.

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<sup>157</sup> Tomas Francois, Melé Patrice, « Patrimoine et action publique au centre des villes mexicaines », in *Caravelle*, n°73, 1999. pp. 331-333

<sup>158</sup> La Razón. « *Fernando Mercado Fortalece El Turismo En La Magdalena Contreras.* » Online newspaper, 12 Aug. 2016, [www.razon.com.mx/ciudad/fernando-mercado-fortalece-el-turismo-en-la-magdalena-contreras](http://www.razon.com.mx/ciudad/fernando-mercado-fortalece-el-turismo-en-la-magdalena-contreras).

Therefore, there are local actors of heritage and cultural management, but there is a lack of budget and personnel to manage a more direct process of protection and gestion by these actors.

*d. Other institutional actors involved in the site.*

Since the Magdalena River is located in the study area, according to the *Ley Nacional de Aguas Nacionales* (Law of National Waters)<sup>159</sup>, the area within 5 to 10 meters on each side of the riverbed is a federal zone under the jurisdiction of the *Comisión Nacional del Agua* - CONAGUA, (National Water Commission).

A particularity that we must consider in our case study on state level, is the fact that *Los Dinamos*, by having territory designated as *Suelo de Conservación* (Conservation Land)<sup>160</sup>, involves authorities as well like the la the *Secretaría del Medio Ambiente de la CDMX* - SEDEMA (Secretariat of Environment of Mexico City), its commission the *Comisión de Recursos Naturales y Desarrollo Rural* - CORENADR (Natural Resources and Rural Development Commission), responsible for the conservation, preservation and protection of the conservation land, the PAOT, and the *Dirección General de Ecología y Sostenibilidad* at the mayor's level (General Department of Ecology and Sustainability).

*e. Problems observed in the management of cultural and heritage projects, a slow and restricted process.*

It is noted two main strata in the management of heritage, the federal and local actors, often hindered by the difficulty of exchange between these two levels. Different ruptures can explain these obstacles: a rupture between powers, a spatial rupture and a temporal rupture.

First of all, in terms of governance, three levels of decision making share jurisdiction over the same territory of a city, and there are strong divisions between these levels that can penalize discussions, namely the federal level, which manages different infrastructures such as highways, or the before mentioned programs; the state, which manages transportation, traffic

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<sup>159</sup> Diario Oficial de la Federación, *Ley de Aguas Nacionales*, Artículo 3, fracción XLVII, 2023. Consulted June 2023, from: <https://www.diputados.gob.mx/LeyesBiblio/pdf/LAN.pdf>

<sup>160</sup> GDF, *Atlas cartográfico del suelo de conservación del Distrito Federal*, *Secretaría del Medio Ambiente, Procurduría Ambiental y del Ordenamiento Territorial del Distrito Federal*, México D.F., 2012, 96 pp.

and security; and finally the municipality, which manages the issue of urban development, housing, public spaces, and local stakeholders, which we will address shortly.

In relation to this separation of powers, there is a spatial rupture, with sometimes a lack of institutional relations or prompt communication between the municipalities, the states and the federation: this represents a real obstacle to the implementation of urban development on a metropolitan scale, and more specifically to the implementation of heritage protection plans in the city.

The temporal rupture is visible in the presence of representatives in their mandate. The implementation of urban and heritage projects requires a continuity that goes beyond the three-year term of office for the city and the six-year term of office for the state, which are not renewable. The direct consequence of these three breaks is the absence of coherent instruments for metropolitan urban planning, and of participation and consultation with the population.

In addition, these actors often plan or develop proposals based on policies that too often turn out to be theoretical and do not translate into concrete protection measures. This can be explained in particular by the fact that the notion of heritage, which is very broad, includes in the legal texts areas that go beyond cultural and heritage protection. In 1996, the term "archaeological resource management" was used, but this means that archaeological resource management is an interdisciplinary field, also involving the management of fields such as education, and going beyond the traditional objectives of heritage protection and conservation<sup>161</sup>. Thus, the actors in the management of heritage policies in Mexico often find it difficult to articulate theory with practice, knowing the institutional complexity and rigidity to establish a conception of heritage itself.

As a result, it is complex to identify tasks within the existing institutional mandate. It would therefore be important to limit these institutional constraints in order to improve the ease of action of these actors and thus to allow greater flexibility in the implementation of projects.

To advance management policies at the state level, one solution could be the participation of international actors, who can intervene in the field of heritage, and who take into account in particular the challenge of enhancing and protecting industrial heritage.

Mexico participates in UNESCO's actions, notably through agreements as we will see in the next part. The INAH has created a World Heritage Directorate that has drawn attention to

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<sup>161</sup> García Nelly, Corbett Jack, «*Heritage Resource Management in Mexico* » in *Cultural Heritage Management: a global perspective*, University press of Florida, 2011, chap. 8, p. 2.

central themes such as heritage integrity, the search for management indicators and international guidelines for heritage classification.

But despite efforts by INAH to try to highlight the issue of management policies at the international level, there is a gap between the official discourse and the claims of the culture and heritage sectors, particularly with regard to the benefits that people derive from valuing heritage sites in terms of funding. And also, we can see that these large institutional models do not necessarily help on a smaller scale for managing the valorization and conservation of heritage.

The INAH finally lacks budgetary flexibility, being subject to a very centralized control, and does not facilitate the self-management of heritage assets. This explains why it is so difficult for a municipality like Magdalena Contreras to manage its heritage very effectively. It would be necessary for the latter to be able to establish a series of strategies to facilitate the resolution of problems related to the allocation of resources. This is complex to establish for a study area like ours, which extends over two more municipalities or even in the specific case of *Los Dinamos*, which must reconcile the use and conservation of the territory in question.

Therefore, the management of heritage gives rise to the establishment of management programs and planning for each project, which are not necessarily well funded in terms of conservation. Projects like the *Programa de Rescate Integral del Río Magdalena* (Integral Rescue Program for the Magdalena River), in charge of the *Universidad Nacional Autónoma de México* - UNAM, which considered in some way the rescue of the industrial heritage in the basin, but finally, it sought to prioritize the sanitation and ecosystemic management of the Magdalena River basin and riverbed. The planning stage began in 2006 and its implementation, planned in three stages, would conclude in 2012<sup>162</sup>, with an expected investment of 5,623,505 euros<sup>163</sup> and because of the aforementioned ruptures (of power, space and time), several of the specific projects, (like the ones involving the industrial heritage and the *Dinamos*), of the integral plan have not been completed to date.

What would be the best management method to implement in order to encourage more action in the preservation of the industrial heritage for the municipality? It would be necessary

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<sup>162</sup> Secretaria del Medio Ambiente Gobierno del Distrito Federal, « *Programa de Rescate Integral del Río Magdalena*», 2012, p. 14, Retrieved January 2023, from <https://www.claraboya.com.mx/rio-magdalena#>

<sup>163</sup> \$105,504,661 pesos, *ibid*, p. 30.

to rethink the teams associated with the management of heritage, small teams, but which could be trained accordingly, and having a versatile role. One of the solutions currently being thought of that could remedy this very traditional structure of the INAH would be the alternative models of cultural heritage management, as suggested by the Dublin or *Nizhny Tagil* Charters, involving stakeholders in the community, who are in fact very active and present around the projects in the municipality.

In France, there is an implementation of consultation tools facilitates heritage management. For a project management, a local commission is constituted in consultation in order to launch calls for tender for the choice of service providers. A neighborhood association exists for our case in Magdalena Contreras, the *Comisión de Cultura y Patrimonio amigos de la Magdalena* (Commission of Culture and Heritage friends of the Magdalena), but in reality, it has little to no impact on the management of heritage projects and only organizes conferences on the subject. In addition, it does not deal with industrial heritage. Thus, it would be interesting for the municipality to set up better means of consultation to participate in the best way in the realization of the projects, with agents with diverse competences, urban planners, jurists and historians who could represent the elected officials and the inhabitants. Moreover, public inquiries could be created in order to collect the opinion of the inhabitants.

We can still see that solutions exist to make the cultural and heritage institutions in place in Mexico and in Magdalena Contreras more flexible. But the institutional rigidity fragments the relations between actors and participates in slowing down concrete decisions for the protection of the heritage. In addition, the lack of experience of some agents due in part to these rigid institutional mechanisms does not allow for greater efficiency in managing these policies. There are multiple clashes of interests between governmental, institutional and local stakeholders, who prioritize their own interests, mostly related to economic aspects. These discrepancies hinder dialogue and hinder the implementation of joint projects.

It would then be necessary to make these different actors cohabit through alternative management models.

## II. Legal protection of the industrial landscape of Los Dinamos

### a. A natural site, a park and a municipality with built heritage.

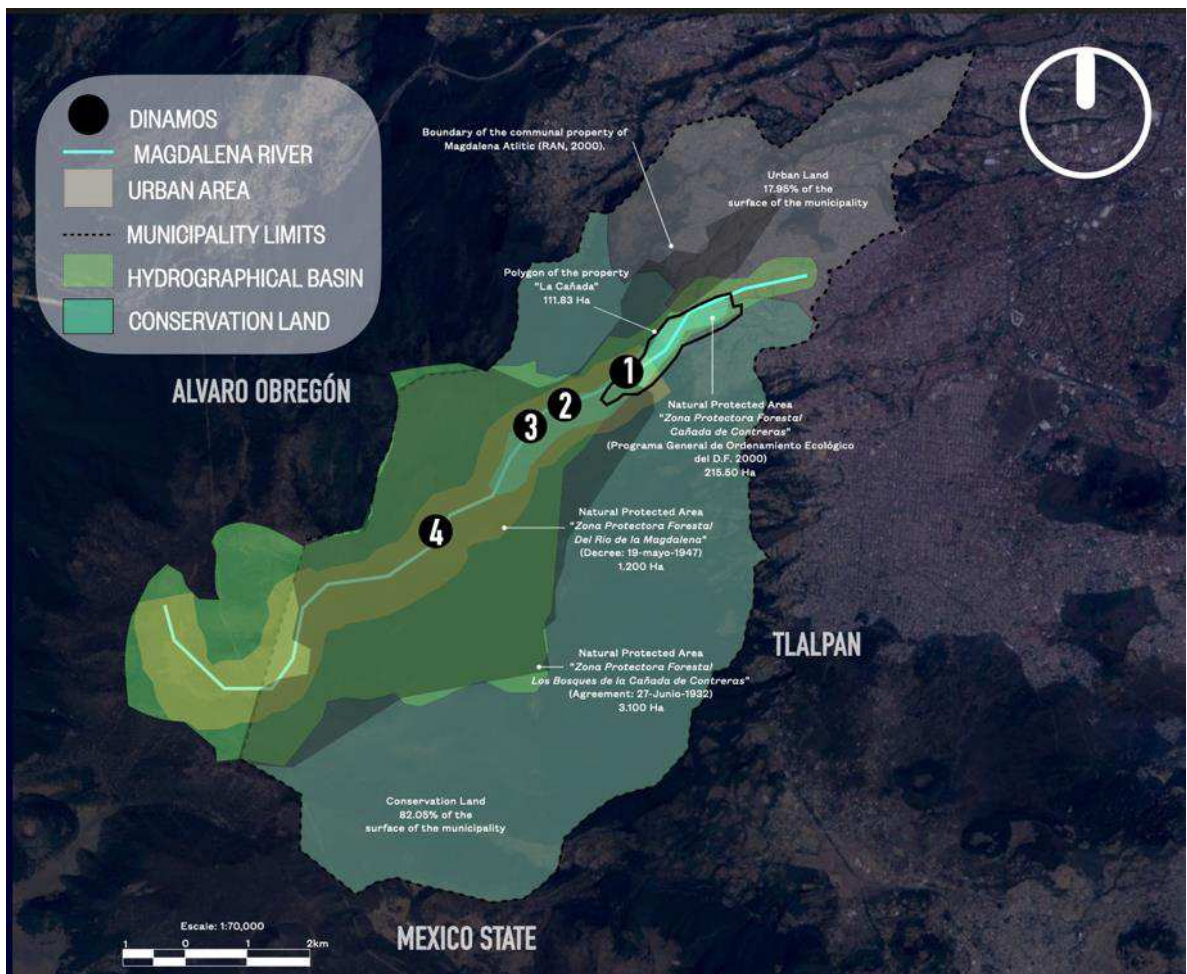
As we can observe in figure 68, the four *Dinamos*, are contained in a multiple layer of legal demarcations, first being part of the federal denomination of *Suelo de Conservación* (Conservation Land), followed by a denomination of ANP - *Area Natural Protegida "Zona Protectora Forestal Los Bosques de la Cañada de Contreras"*, (Natural Protected Area), with 3,100 Ha (Agreement: June 27, 1932), which in turn contains the ANP "*Zona Protectora Forestal del Río de la Magdalena*" with 1,200 Ha (Decree: May 19, 1947). The second, third and first dinamo are also located within the ANP "*Zona Protectora Forestal Cañada de Contreras*" with 215.60 Ha (*Programa General de Ordenamiento Ecológico de la Ciudad de México*, 2000) and above all, all four are located within communal lands, whose origin is generated in the forms of land tenure and use in pre-Hispanic times, recognized in the Mexican Constitution in Article 27 as social property. Communal property is associated with the term community and is constitutionally understood today as "a population nucleus formed by the set of lands, forests and waters, which were recognized or restituted to it, and of which it has presumably had possession for immemorial time, with common customs and practices"<sup>164</sup>. This implies that the communal group has the right to the distribution of the land and to enjoy the goods of common use, to be consulted and to have their interests in the territory considered.

Being contained in multiple demarcations, both the industrial heritage and the natural environment remain in an ambiguous legal situation.

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<sup>164</sup> INEGI, Núcleos agrarios. Tabulados básicos por municipio. Michoacán de Ocampo. Programa de Certificación de Derechos Ejidales y Titulación de Solares, PROCEDE, 2004, p. 93

Figure 68. Area of study and legal demarcations



Own elaboration based on: Jujnovsky et. al, *Forest Protected Areas: The case of the Contreras glen forest*, 2014. Base map: INEGI and Google Earth.

As we saw in the first chapter, this territory provides environmental services and, thanks to its geophysical characteristics, contains an important ecosystemic diversity, the environmental aspect has been integrated into the conservation approach of the municipality in the demarcations shown in Figure 68; also by virtue of the *Ley de Patrimonio Cultural, Natural y Biocultural de la Ciudad de México* (Law of Cultural, Natural and Biocultural Heritage of Mexico City)<sup>165</sup>, industrial heritage, which in fact is already identified and catalogued by the INAH, should be preserved, protected, conserved, revalued, researched and disseminated. Therefore, it is necessary, within the framework of the conservation of this natural and built

<sup>165</sup> Gaceta Oficial de la Ciudad de México, *Ley de Patrimonio Cultural, Natural y Biocultural de la Ciudad de México*, Last amendment published in the G.O.CDMX October 27, 2022



heritage, to implement management instruments for the conservation and protection of this heritage.

The current jurisdiction has the problem that the protection of industrial heritage is not integrated with the protection of natural areas, as in the case of this industrial landscape is fully integrated into the natural environment. And even the protection of the natural heritage, which is taken into account through actions that contribute to the ecological improvement and restoration of the natural site, has problems of denomination.

A particularity related to the study area that should be first mentioned is that the "Bosques de la Cañada" zone, where *Los Dinamos*, are located, has two federal decrees<sup>166</sup>, one from 1932 that declares the zone as a "Forest Protected Area" and another from 1947 that declares it as a "Forest Protected Area of the Magdalena River".

However, the *Comisión Nacional de Áreas Naturales Protegidas* - CONANP (National Commission of Natural Protected Areas) does not currently recognize it as a Natural Protected Area (ANP) because the technical studies mentioned in the *Artículo Octavo Transitorio de la Ley General del Equilibrio Ecológico y la Protección al Ambiente* (Eighth Transitory Article of the General Law of Ecological Balance and Environmental Protection), were never carried out so that it could be included in the category of *Zona de Protección de Recursos Naturales* (Natural Resource Protection Zone)<sup>167</sup>. In 2015, the entire municipal area, with the exception of the urban area, was considered a conservation area. This only increases the ambiguity of the actions to be taken for their protection and the actors that should be involved.

Currently, CONANP in Mexico City has a total of 10 ANP and in this territory, decisions and strategies are aimed at combining the functions of conservation, research, economic development and recreation assigned to these areas. Consequently, their use is associated with their conservation.

This designation of ANP determines the definition of management policies and the use of natural resources.

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<sup>166</sup> See Figure 68.

<sup>167</sup> Alcaldía La Magdalena Contreras, *Proposición con Punto de Acuerdo (PDA)*, 2022.

Like the industrial heritage in *Los Dinamos*, the natural environment also faces significant challenges for its preservation, especially because of urban sprawl, deforestation, and pollution, which threatens its integrity.

The First and Second Dinamo are surrounded by areas of irregular settlements that maintain uncontrolled recreational activities in their extension and tend to occupy a lot of space in the forest<sup>168</sup>. These settlements are not regularized, and these irregular settlements also lead to the degradation of agricultural practices and the use of forest resources. Finally, the presence of authorities is practically non-existent in *Los Dinamos* and, in addition to impacting control of the site, this poses a serious problem of more general social insecurity in the municipality. This lack of personnel affects monitoring and enforcement in the area.<sup>169</sup>.

In the event that *Los Dinamos* is again considered a natural protected area in the future, it is crucial to implement solid measures of protection and conservation of the natural environment, hand in hand with the industrial heritage that also faces significant challenges for its preservation.

*b. Legal tools in Mexico, the problem of industrial heritage protection.*

Let us now look at the legal tools that could be used to promote this urban and industrial heritage in the long term. Mexico already has legislation on built heritage; however, it is necessary to be able to give importance to the protection of the site, make it visible and provide information on its condition. There is an extensive body of legislation specific to the cultural policy of the Mexican State, consisting of constitutional articles, provisions relating to cultural administration and various laws and regulations governing the rules of the heritage sector, in addition to those set out in Table 7, in the previous section.

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<sup>168</sup> Diario Oficial de la Federación, *Programa Delegacional de desarrollo urbano de Magdalena Contreras*, 1997. These include the installation of shops, recreational activities such as horseback riding, mountain bikes and restaurants. The municipality of Magdalena Contreras, in coordination with the Natural Resources Commission, is carrying out an assessment of irregular settlements within the site.

<sup>169</sup> Taty Pérez Barceló C., «Zonificación de riesgo en el parque de Los Dinamos, asociado a amenazas por inestabilidad de la capacidad de respuesta de los usuarios valorada a partir de su percepción de riesgo», Thesis of geography, Universidad Nacional Autónoma de México, Facultad de Filosofía y Letras, 2015, p. 37-68.

Firstly, in the *Constitución Política de Los Estados Unidos Mexicanos* (Constitution of the United Mexican States)<sup>170</sup> many articles refer to culture: in particular, article 73 refers to the fact that the *Congreso de la Unión* (Congress of the Union) may legislate on archaeological, artistic and historical monuments whose conservation is considered of national interest. This constitution gives rise to a series of important laws that constitute the main provisions on cultural management: in particular, there is the federal law on archaeological, artistic and historical monuments and areas of May 6, 1972<sup>171</sup>; the *Leyes Orgánicas* (Organic Laws) of INAH of 1939<sup>172</sup> and INBAL<sup>173</sup> of 1946. In addition to these federal and organic laws, there are also regulations related to them, such as the *Reglamento de la Ley Federal sobre Monumentos y Zonas Arqueológicas, Artísticas e Históricas* (Regulations of the Federal Law on Archaeological, Artistic and Historic Monuments and Zones), dating from 1975<sup>174</sup>; and finally, the most recent law on heritage protection in Mexico is the *Ley de Patrimonio Cultural, Natural y Biocultural de la Ciudad de México* (Law of the cultural, natural and biocultural heritage of Mexico City) of 2020<sup>175</sup>.

What can these laws contribute to the practical protection of our heritage, and in our case our built heritage? The before mentioned, Federal Law of Archaeological, Artistic and Historic Monuments and Zones of 1972 is defined as the one that "regulates and protects the cultural heritage of the nation, establishes the obligation of the owners to maintain and conserve it, as well as the rules for its restoration, demolition or reconstruction, and regulates its trade and temporary export". This law contributed to the creation of the public registry of archaeological and historical monuments and zones, which made it possible to register not only the cultural heritage, but also the built heritage. It is interesting to note here the notion of restoration, demolition and reconstruction, a key concept in the context of our study, with the demolition of the factories of the Industrial System and the lack of restoration of heritage that remains out of use, such as *Los Dinamos*.

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<sup>170</sup> Constitución Política de Los Estados Unidos Mexicanos, full text published in Diario Oficial de la Federación, 1917, updated to the constitutional amendment 2005.

<sup>171</sup> It has been modified several times: in 1974, 1981, 1984 et 1986.

<sup>172</sup> This law was amended in 1986.

<sup>173</sup> This law was amended in 1950.

<sup>174</sup> This regulation has been modified in 1993.

<sup>175</sup> Gaceta Oficial de la Ciudad de México, *Ley de Patrimonio Cultural, Natural y Biocultural de la Ciudad de México*, Last amendment published in the G.O.CDMX October 27, 2022

Since the period of deindustrialization in the eighties, Mexico's industrial heritage is very diverse, in several places of the city you could see tall chimneys occupied at night by birds, warehouses and buildings. But the industrial heritage is little recognized, and several elements were disappearing. In the recent law 2020 on the cultural, natural and biocultural heritage of Mexico City, in article 29, it is stipulated that the industrial centers can be considered part of the material cultural heritage of the city<sup>176</sup>, previously, there has been the problem to ensure the protection of the built industrial heritage and, in general, to demonstrate the value of industrial heritage in the eyes of the country.

One solution to protect our industrial landscape would be to consider, as mentioned above, partial programs such as the one in effect in downtown Mexico City, the *Plan Integral de Manejo del Centro Histórico de la Ciudad de México* (Integral Management Plan for the Historic Center of Mexico City)<sup>177</sup> with a perimeter demarcated as a zone of historic monuments, and each property catalogued within it. As we have explained, Magdalena Contreras has an urban development plan, but it does not have the degree of definition that the partial programs have, with sufficient precision to cover all the characteristics of the different heritage and industrial zones.

As in the case of Mexico City, it would be interesting to establish this perimeter as a zone of historic monuments. The zone in question for Mexico City was defined by decree in 1980 and is subdivided into two subzones, the first covering the city from the 18th and early 19th centuries, and the second covering most of the city's expansion until the end of the 19th century<sup>178</sup>.

This type of perimeter also makes it possible to encompass the surrounding neighborhoods of the city and assigns an urban function to the heritage policy. It could be a method to be used as such to establish a perimeter around both the conservation land and the urban district of the municipality, thus including not only *Los Dinamos* but also the remains of the old factories. With only the delimitation, the historical value of the site would already be evidenced.

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<sup>176</sup> Ibid, p. 8, article 29: « De manera enunciativa más no limitativa, podrán ser considerados afectos al Patrimonio Cultural Material de la Ciudad, los bienes inmuebles con valor histórico y/o artístico, siguientes: I. Centros industriales; II. Conjuntos arquitectónicos; III. Museos. IV. Obras; V. Residencias; y VI. Sitios ».

<sup>177</sup> Diario Oficial de la Federación, *Plan Integral de Manejo del Centro Histórico de la Ciudad de México*, 2011.

<sup>178</sup> Tomas Francois, Melé Patrice, « Patrimoine et action publique au centre des villes mexicaines », in *Caravelle*, n°73, 1999.

There is a real problem with the financing of heritage projects. When a building is protected in Mexico as a historic or artistic monument, in the end no economic benefit is obtained, for example in the form of aid for construction work. As a consequence, many protected monuments are abandoned because of the cost of their maintenance and enhancement. Our study is not so unusual, as the example of many abandoned sites such as the second Dinamo itself shows.

Another problem in terms of heritage financing lies in the logic of patronage. In Mexico there is no legal regime for patronage, although there are various legal provisions, more specifically fiscal, that protect and promote the operation of cultural foundations and non-profit civil associations.

Although there have been projects that involve the conservation, recovery and transformation of industrial sites, for example in shopping malls, cultural centers, as is our case with the factories of the Industrial system, these projects are the few in which the history of the site is finally put in evidence, limited to the transformation of the property. There are also cases where, because they are cataloged and require special measures for remodeling, it is common that these sites are left abandoned until demolition is the only way to reuse the space.

In general, it is through tourism that the State tends to seek to solve this economic problem by associating its cultural and built heritage with this logic of international attractiveness, as evidenced by its adherence to numerous UNESCO<sup>179</sup> international conventions and the creation of Tourism Secretariats to develop the country's cultural attractions.

However, even so, we see that industrial heritage on a national scale continues to be little visible, with tourism being more associated with archaeological and historical heritage. This explains, more generally, the lack of promotion of this type of heritage in Mexico, despite the fact that in some cases, such as in Puebla, tools have been implemented to protect and promote existing abandoned industrial sites.

But there is a real obstacle to the application of legal texts and tools, especially due to the lack of financial support for the actual implementation of protection. In the end, it could be the

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<sup>179</sup> Mexico is a member of UNESCO's World Heritage Convention, and also takes part in meetings such as the Meetings of Ministers of Culture and those responsible for cultural policies in Latin America and the Caribbean. Mexico currently has more than 61 bilateral cultural exchange agreements in force. For further information, see: Trainmonher (Training in Monumental Heritage) study, "Cultural Policy - Mexico", Universidad Michoacana de San Nicolás de Hidalgo (UMSNH), 2010, p. 6-7. Mexico has signed numerous agreements with other countries to protect its heritage. There is, for example, the bilateral agreement with Peru: Convention for the Protection and Restitution of Archaeological, Artistic and Historical Monuments, 1975; UNESCO Convention of 1970, etc.

international and touristic aspects that could lead to a better preservation of a relatively unknown industrial heritage for Mexico.

*c. Protection, regulation and legal tools to provide for industrial landscapes in relation to the legislation in Mexico and France*

In France, there are several protection, regulation, and legal tools in relation to legislation for both industrial and natural heritage, being the most important the *Lois sur la protection du patrimoine* (Heritage Protection Laws), to protect its cultural and natural heritage. The *Code du Patrimoine* (Heritage Code) encompasses provisions for both industrial and natural heritage preservation, including the protection of significant sites, structures, urbanism, landscapes, and ecosystems. France maintains as well various inventories and registers to of heritage<sup>180</sup>. These inventories aid in recognizing, cataloging, and protecting important heritage assets, and Industrial and natural heritage sites can be classified as Historic Monuments, granting them legal protection against alterations, demolition, or any activities that may harm the integrity of the site. Also as mentioned before, the presence of committees and advisory bodies provide guidance and expertise in matters related to industrial and natural heritage.

In relation to economic aspects, the government provides financial incentives, grants, and tax benefits to support the preservation and restoration of heritage sites and landscapes. These measures encourage private owners and public institutions to invest in the heritage.

Furthermore, France places a strong emphasis on public awareness and education regarding industrial and natural heritage. The country organizes various educational programs, public outreach initiatives, and exhibitions with the aim of engaging communities and promoting appreciation for these heritage assets.

In this context, the *Plan de sauvegarde et de mise en valeur* PSMV (Conservation and Valorization Plan) of the city of Troyes, developed in 2013 in accordance with the French heritage code, exemplifies a typical protection plan for a French neighborhood. The plan includes a range of measures that can complement the protection of the study area, ensuring its preservation and sustainable management.

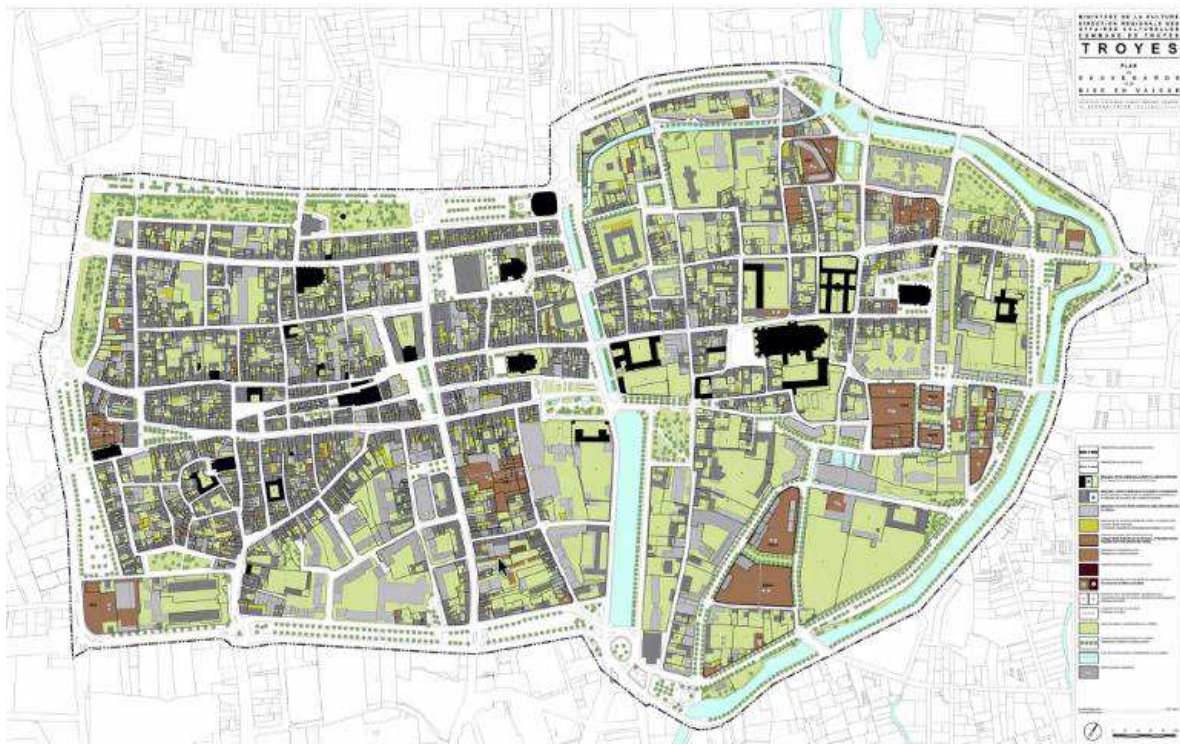
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<sup>180</sup> These include the Inventory of Historical Monuments, the Inventory of Industrial and Technical Heritage, the Inventory of Natural Monuments, and the Regional Inventories.

First, the plan has undergone modifications in its delimitation since 1964 and has identified historical monuments, archaeological zones, urban, architectural and landscape heritage protection zones, as well as local urban planning schemes. In addition, the plan's presentation document includes historical information on the elements present in the conservation polygons, lost heritage, demolitions carried out, old maps, photographs and descriptions of the urban and architectural space, among other relevant data. These measures and data contained in the Troyes Conservation and Valorization Plan contribute to a better understanding, conservation and enhancement of the city's heritage, offering a detailed and contextualized vision of its historical and architectural richness.

The plan in Figure 69, for example, contains information that first delimits the perimeter of the protected area in the city of Troyes, with footnote annotation of movable property, buildings, elements or spaces to be protected or preserved, or where demolition could be imposed, as well as possible and variable building rights, public walkways, existing bodies of water and green areas.

**Figure 69. Safeguarding and enhancement plan for the city of Troyes.**



**Source:** PSMV by the Ministry of Culture for the city of Troyes, October 2013, recovered November 2022 from : [https://psmv.ville-troyes.info/document-graphique/03\\_PLANCHE\\_GRAPHIQUE\\_PSMV\\_06\\_01\\_2020.pdf](https://psmv.ville-troyes.info/document-graphique/03_PLANCHE_GRAPHIQUE_PSMV_06_01_2020.pdf)

In contrast to the detailed description and mapping found in the Troyes Plan, it appears that in our case study, the industrial landscape of the Magdalena River, there is a lack of specific plans detailing the architectural and built heritage. The closest available information seems to be the catalog cards provided by the INAH, which describe the properties and their locations. However, it seems that there are no specific plans or safeguard zones dedicated to the protection of the architectural and built heritage in *Magdalena Contreras*. This highlights a potential gap in terms of comprehensive planning and protection measures for the city's heritage assets.

It is important to consider the tools in France in terms of legal protection, seeking the creation of a PSMV, would help defining the safeguard zones and the perimeter, considering natural areas, private and tourist built-up areas. This would allow a more detailed urban planning of territory like ours and the possibility to develop specific projects that follows the heritage axis as a guide.

In France, with its good financing and economic stability, there are "project holders" and "project directors" in charge of carrying out the heritage studies that present proposals for protection and enhancement in stages. The aim is to maintain the integrity of the heritage sites while preserving the integrity of the natural landscape or enhancing the surrounding urban area. These projects follow administrative procedures that include information and consultation phases, with public meetings, exhibitions and the creation of local and regional commissions<sup>181</sup>. However, in our study, this aspect of concertation is lacking, as there are actors who do not agree to establish exchanges at the local and federal level.

The lack of coordination and liaison between our stakeholders represents a major obstacle to the development of heritage projects in an industrial landscape such as ours. It is urgent to implement a policy to protect these abandoned industrial landscapes, which tend to remain unprotected.

In practice, it is complicated to apply the legal tools and heritage laws at the state level through the main institutions such as INAH and INBA. Even at the local level, the municipality struggles to protect abandoned sites like ours, leaving them to be used as warehouses by merchants.

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<sup>181</sup> Public meetings can be organized, with discussions and debates with local residents.



### **III. Proposal for the safeguarding of the industrial landscape.**

#### a. Plan for the Safeguarding of the industrial Landscape of the Magdalena River

Safeguarding the industrial landscape has become a major challenge in the quest to preserve our natural and cultural heritage. In this context, the requalification of this territory has emerged in this thesis as a possible solution to revitalize and protect these spaces.

This proposal is based on the evaluation of the territory, the nomination as a ANP (protected natural area), specifically as a national park, proposing the implementation of a National Park Management Program that encompasses both the protection of natural resources and the preservation of the industrial heritage that defines the identity of the place, with the proposal of a plan to safeguard the industrial landscape. This approach seeks to establish concrete actions for the improvement and sustainable use of these spaces, defining priorities and organizing future development based on the proposed objectives and goals.

Considering its natural heritage, the first step is to evaluate the territory in order to reclassify it as a natural protected area in the national park category. Studies such as those created for the Magdalena River rescue master plan provide and support the criteria and requirements that the CONANP establishes for the designation.

In this way, a National Park Management Program can be developed, a planning instrument based on the knowledge of the area's problems, in order to establish the necessary actions to improve the existing natural resources. This program would establish a form of territorial administration, something that is currently not clearly defined, and would also establish mechanisms for the participation of institutions, organizations, and social groups interested in the protection and sustainable use of the protected area.

As part of *Los Dinamos National Park's* program, a parallel plan would be developed to safeguard the industrial landscape.

Based on this, Figure 70 proposes the delimitation of the action polygons, the zoning of areas for the operational management of the natural and social space. It will also indicate objectives and a series of key actions to be implemented, based on the proposed objectives.

Objectives:

- Favor the conservation of the natural area, its biodiversity, and natural resources.
- Enhance the value and conservation of the industrial heritage.

- To organize the tourist activity and to propose new options compatible with the environment, taking advantage of the natural resources, the scenic beauty of the region and its historical and cultural elements.
- Establish the basis for the park's administration.

Table 8 provides a general description of the programs and actions that should be prioritized if the Magdalena river basin is established as a national park.

**Table 8. Key Actions, ANP *Los Dinamos* National Park.**

Key Actions, ANP <i>Los Dinamos</i> National Park.
Elaboration of programs for the conservation and recovery of soil, water and ecosystems.
Elaboration of programs that regulate the activities of use of the natural resources.
To establish the form of administration of the ANP.
Establish, together with CONANP, the National Park's regulations.
Establish agreements and/or collaboration agreements between governmental and institutional actors, such as CORENADR, the Contreras mayor's office, INAH, and CONANP to strengthen actions aimed at protecting the ANP.
Create and maintain an infrastructure for the provision of services for public use areas.

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**Source: Own elaboration. Source: Own elaboration, based on the Management Programs of the Natural Protected Areas of Mexico**

The map in Figure 70 delimits the proposed territory considered for designation as a natural protected area. The criteria for the selection of this area considered the Magdalena River basin up to the limits of the conservation land within the *Magdalena Contreras* and *Álvaro Obregón* and *Cuajimalpa* municipalities, due to the importance of the basin as a provider of ecosystem services and possessor of unique ecosystems, mentioned in Chapter 1.

The following polygons are also delimited: "A. Study area" and "B-Heritage preservation".

Polygon A extends through both conservation land and urban area. It is intended that within this polygon, especially in the urban area, plans for the protection of the Magdalena River will be focused to articulate projects that link the remaining industrial heritage, the elements

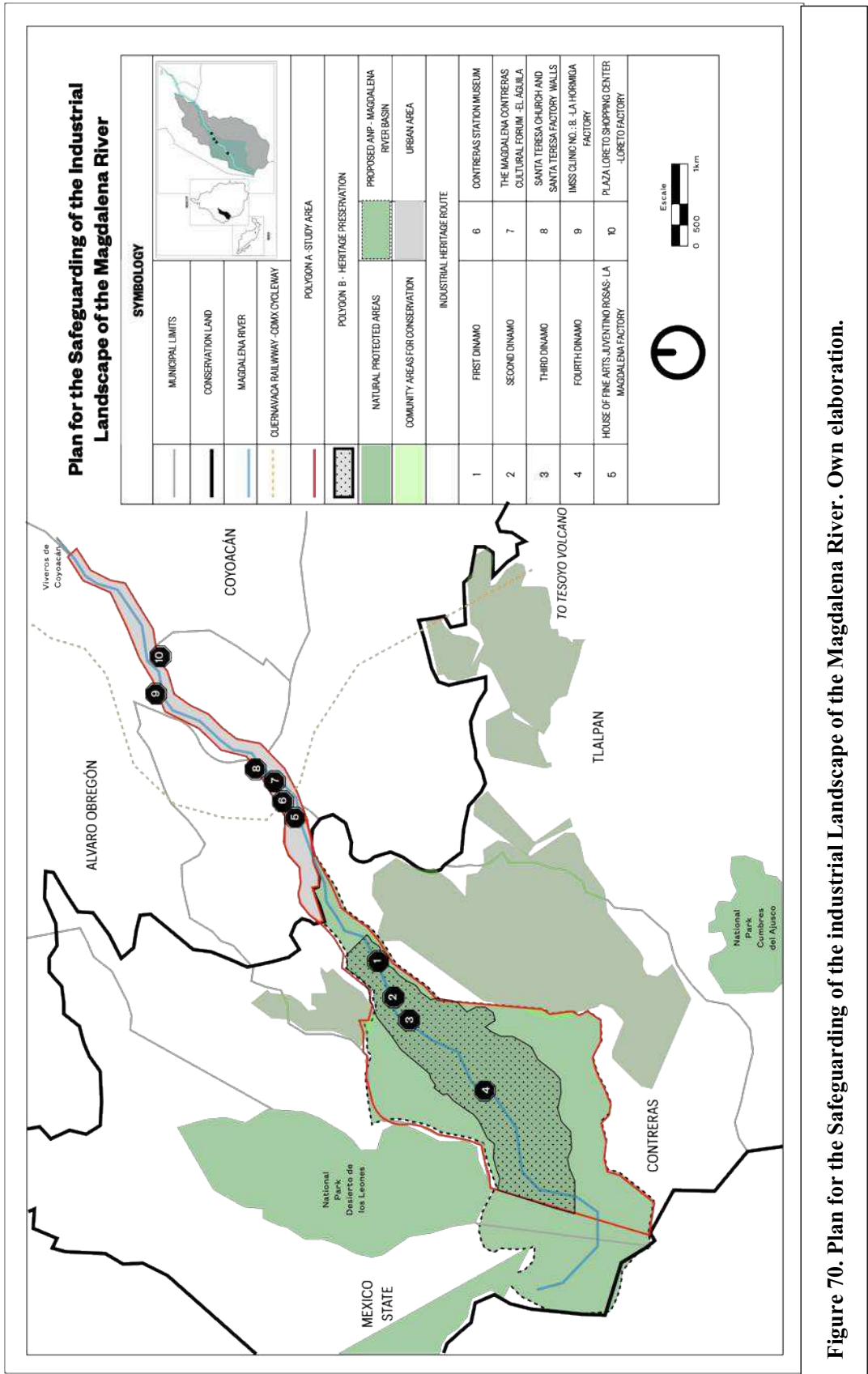
numbered on the map, which are the bicycle path of Mexico City, formerly the old railroad, its community museum, cultural forums and shopping centers, among others.

In the following tables 9 and 10, there will be a general description of the different priority actions to be carried out within its polygon.

**Table 9. Key actions Polygon A.**

Key actions Polygon A
Elaboration of programs for the conservation and recovery of the Magdalena River in the urban area.
Establishment of agreements and/or collaboration agreements between governmental and institutional actors, such as SEDEMA, municipalities and INAH, to strengthen actions aimed at the care of the Magdalena River and its remaining industrial heritage in the urban zone of polygon A.
Develop inter-institutional and academic mechanisms for an adequate flow of information on restoration and preservation actions of the patrimonial route.
Articulate and promote collaboration between universities and archives for the creation of collections and materials related to the heritage route in the area, as well as encourage research in this field.
Promotion and association of the industrial remnants, articulated by the Magdalena River.

**Source: Own elaboration, based on the Management Programs of the Natural Protected Areas of Mexico**



**Figure 70. Plan for the Safeguarding of the industrial Landscape of the Magdalena River. Own elaboration.**

The content of polygon B-Heritage Preservation can be seen in detail in Figure 71. The criteria for the delimitation of the polygon contemplated the inclusion of the *Los Dinamos* canal network as well as part of the perimeter initially stipulated by the 1947 decree, where the study

area had the denomination of "Zona Protección Forestal del Río de la Magdalena" (Magdalena River Forest Protection Zone)<sup>182</sup>.

Extending its surface to the southeast to include the canals on the same side, as well as the camping area and trails leading to the top of *Tarumba* and to the north, the top of *Coconetla*. Polygon B will serve as the perimeter boundary between the activity zone and the preservation zone. The activity zone, represented on the map by a color gradient, delimits three areas for the regularization and delimitation of economic activities within the park and extends from east to west along the Magdalena River.

This map integrates the ecotourism trails that currently exist in the park, along with the proposal of some new ones. Two of the three summits that attract the most tourists in the park, *Coconetla*, *Los Cajetes* and the *Tarumba* summit, are also marked on the contour of the contour line, marking the boundary of the activity zone towards the preservation zone. The gradient is divided into three colors, red for activity, yellow for transition and green for conservation. Starting with the red color as the activity zone, which covers part of the park and the first three *Dinamos*, where most of the activities and stores are located. Activity area would be a zone with a productive and recreational vocation, with increased control put in place by a district council coordinated with the municipality.

The third *Dinamo* is the point where the transition zone begins, which ends at the height where the camping area is located, in the southeast, marking the end of zone two, transition and towards the preservation area that extends from the fourth *Dinamo* to the southwest of polygon B. Transition area, would be delimited in a perimeter where human activities will have to be controlled. This control would make it possible to avoid practices that could alter the natural and industrial heritage.

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<sup>182</sup> See figure 68

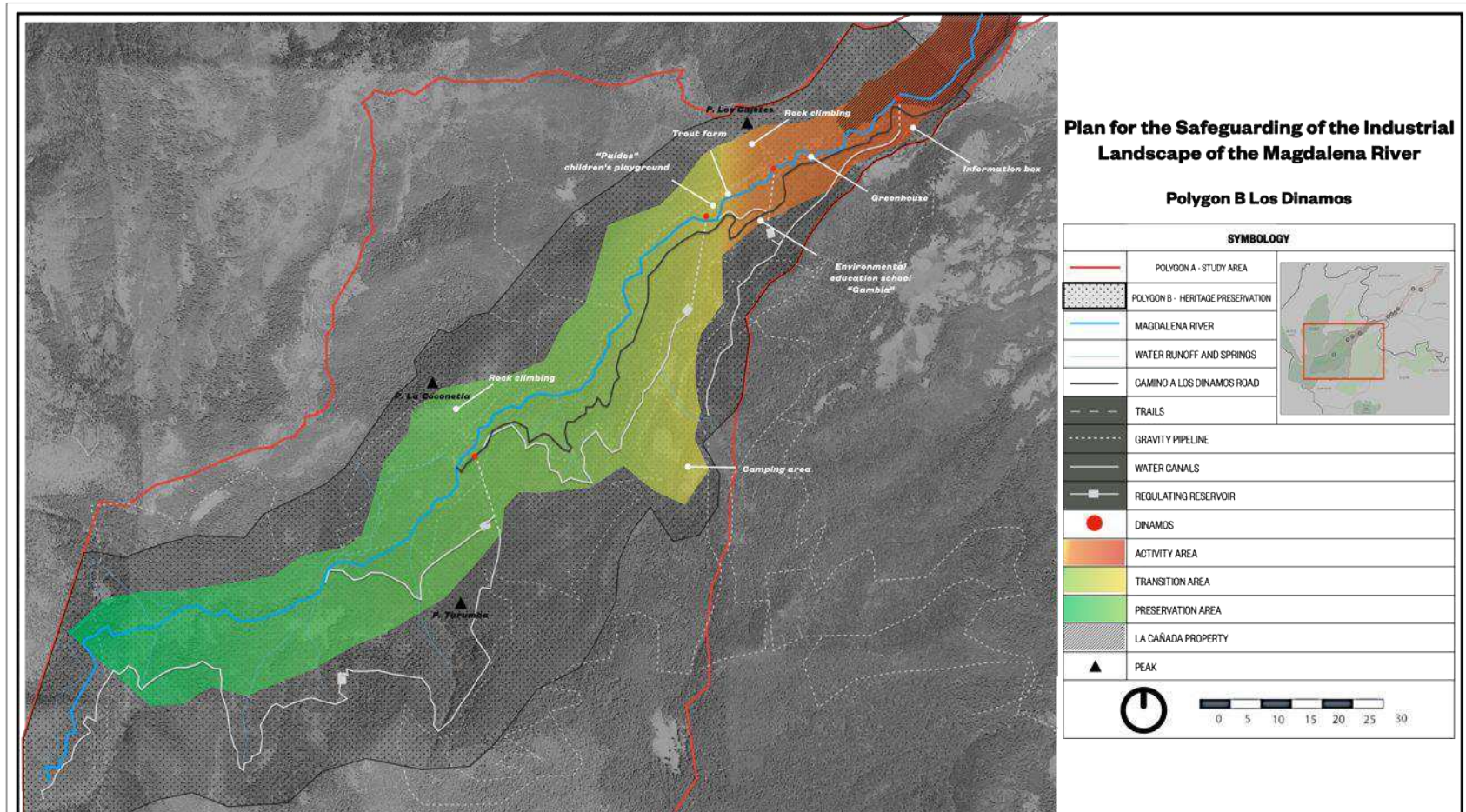


Figure 71. Plan for the Safeguarding of the industrial Landscape of the Magdalena River. Polygon B, Los Dinamos. Own elaboration.

**Table 10. Key actions Polygon B.**

Key actions Polygon B
Establish agreements and/or collaboration agreements between governmental and institutional actors, such as CORENADR, the Mayor's Office of Contreras, INAH and CONANP to strengthen actions aimed at the care of the <i>Dinamos</i> facilities.
Develop inter-institutional mechanisms for an adequate flow of information on restoration actions for the properties.
Establish, together with INAH, the regulations for the use of the various components of the <i>Dinamos</i> .
Regularization, delimitation and control of the economic activities within the activity and transitional zones.
To develop a diagnosis of the tourist services that are offered, the expectations and demands of the visitors, volume of demand, and load of the visited sites, for a better planning of the same ones.
Create, delimit and maintain infrastructure for the provision of services in public use areas.

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**Source: Own elaboration, based on the Management Programs of the Natural Protected Areas of Mexico**

Regarding the key actions in Table 10, I would like to highlight the importance of establishing limits for both infrastructure and activity zones, because they are the most detrimental to the safeguarding of the heritage. Recall that for example, in the Dinamo room, the old engine room is used as a parking lot, or the rooms used as a warehouse in the four *Dinamos*.

b. Musealization of the industrial heritage of Los *Dinamos*?

A possibility to safeguard the buildings that made up the *Dinamos* is the musealization of these old power plants, we can take the example of another industrial site present in Magdalena Contreras: the former textile factory *El Aguila*, which has been transformed into a cultural space. This example highlights the possibility of valuing a built heritage site within Magdalena Contreras through a requalification. Although the positioning of the *Dinamos* plants in this

natural site, as well as the degradation of the building restricts this possibility of valorizing in the same way the old power plants in relation to this cultural forum, the less deteriorated parts and buildings, such as the first, second and part of the fourth Dinamo, could hold historical information about the industrial landscape that the Magdalena River once was, about the formation and creation of the *Dinamos*, and even information about the generation of hydroelectric power. Also, the intervention of such deteriorated spaces as the third and fourth Dinamo, for the creation of pavilions and squares, is an opportunity for safeguarding and enhancement, since the extraction of materials (such as bricks and stones) is a current problem generated by the construction of more huts.

In Mexico, some examples reveal the possibility of valorizing an industrial site by setting up a park or a museum: this is the case of the Fundidora Park located in the city of Monterrey, which contains the former largest iron and steel company in Latin America, the Fundidora de Fierro y Acero de Monterrey. The buildings that used to house the company have been rehabilitated into a museum, but this remains problematic in our case in view of the dilapidated state of our industrial site. The logic of valorization of the site remains very interesting, in particular with regard to the offer of services offered by the museum. It would then be interesting to imagine the possibility to museify or to establish a scenography allowing to guide the visitors and the tourists, but also the locals, in this site with this double natural-industrial dynamics.

The best would be to go beyond the notion of isolated heritage: it would be necessary to integrate the whole of this space including the hydroelectric power stations, but also the factories and the dwellings of the former workers, and any presence of a building that could testify to this industrial heritage. In order to do this, an existing means would allow to regroup these old power plants with the rest of the municipality's heritage: the setting up of an eco-museum. Through this achievement, the industrial landscape of *Los Dinamos* would be highlighted. Ecomuseums are present in Mexico, as for example in Puebla, where the Ecomuseum of Metepec was created in 1984. This site was also in precarious conditions with the closure of its textile factory in 1967<sup>183</sup>. While as an ecomuseum, the case of Metepec has its minor flaws, cause the integration of the elements in a vision is somehow lacking, there is

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<sup>183</sup> Humberto Morales Moreno, « Les Écomusées du patrimoine industriel au Mexique : des institutions encore actuelles ? », dans *e-Phaïstos, Revue d'histoire des techniques*, 2020.



an interpretation that allows for the appreciation and understanding of the history of the local population's development. And it should be highlighted that in their effort of valorization, they created an archive, a museum, landscape routes, and fostered collaboration and research with universities and members of the community.

The site is now part of a tourism center in Mexico, which includes a diversity of buildings with the old factory, but also the houses of the employees and a former museum. In the same way for *Los Dinamos*, it would be necessary to be able to set up the design of a narrative program with a pleasant and ludic space to welcome visitors. A logic of heritage route could be established through the municipality, starting from the buildings present in the urban area, passing from the old railway station that transported raw materials for the factories, to the old hydroelectric plants of the four *Dinamos*. This valorization could allow to revitalize the attractiveness of the municipality through the cultural field. But to do this, it would be necessary to have actors fully involved in the management and protection of the industrial heritage within the municipality.

Thus, can be notice the potential that could hold the valorization of this industrial heritage, which is however to date left in disuse.

How to keep in memory the industrial history of this territory through the use of hydroelectricity, if not to preserve and value the industrial landscape of *Los Dinamos*. The intangible heritage, that is to say the old practices and know-how from the factories and power plants, the techniques and methods used, seem to be quite unknown to the locals and foreign visitors coming mainly for the natural heritage of the site. Programs of requalification would then be interesting to establish but could not be done without the participative and collaborative involvement of the actors of management of the patrimonial and cultural policies of Mexico.

c. Proposal for the reutilization and association of the industrial Landscape of the Magdalena River

The goal of the proposal in Figure 72 is to associate the elements of the industrial landscape of the Magdalena River and to present specific projects in accordance with the objectives of the " **Plan for the Safeguarding of the industrial Landscape of the Magdalena River.**" described above.

This proposal seeks to link elements marked 1 through 11 within Figure 72, which spans from the southwest with the fourth Dinamo to element 10, Plaza Loreto in the northeast, within the study polygonal.

The second Dinamo, being a strategic point due to its accessibility, state of conservation and current user traffic, becomes the central landmark from which two different linkage perspectives emerge. Towards the southwest, it is proposed to transform the two buildings that make up the second Dinamo into a museum that exhibits its history and operation, called "Museum of the Second Dinamo". In addition, it is proposed to reach an agreement with the community members who own the first Dinamo to transform these facilities into a local archive that collects photographs and oral histories of the inhabitants of the community, which would then be used in temporary exhibitions in the museum.

Given the state of conservation of the third Dinamo and considering its spatial characteristics, according to the transition plan of the proposal in Figure 71, it is proposed to transform this space into the access lobby to the areas dedicated to conservation. Taking advantage of the existing facilities, interventions could be made to create an art and culture pavilion.

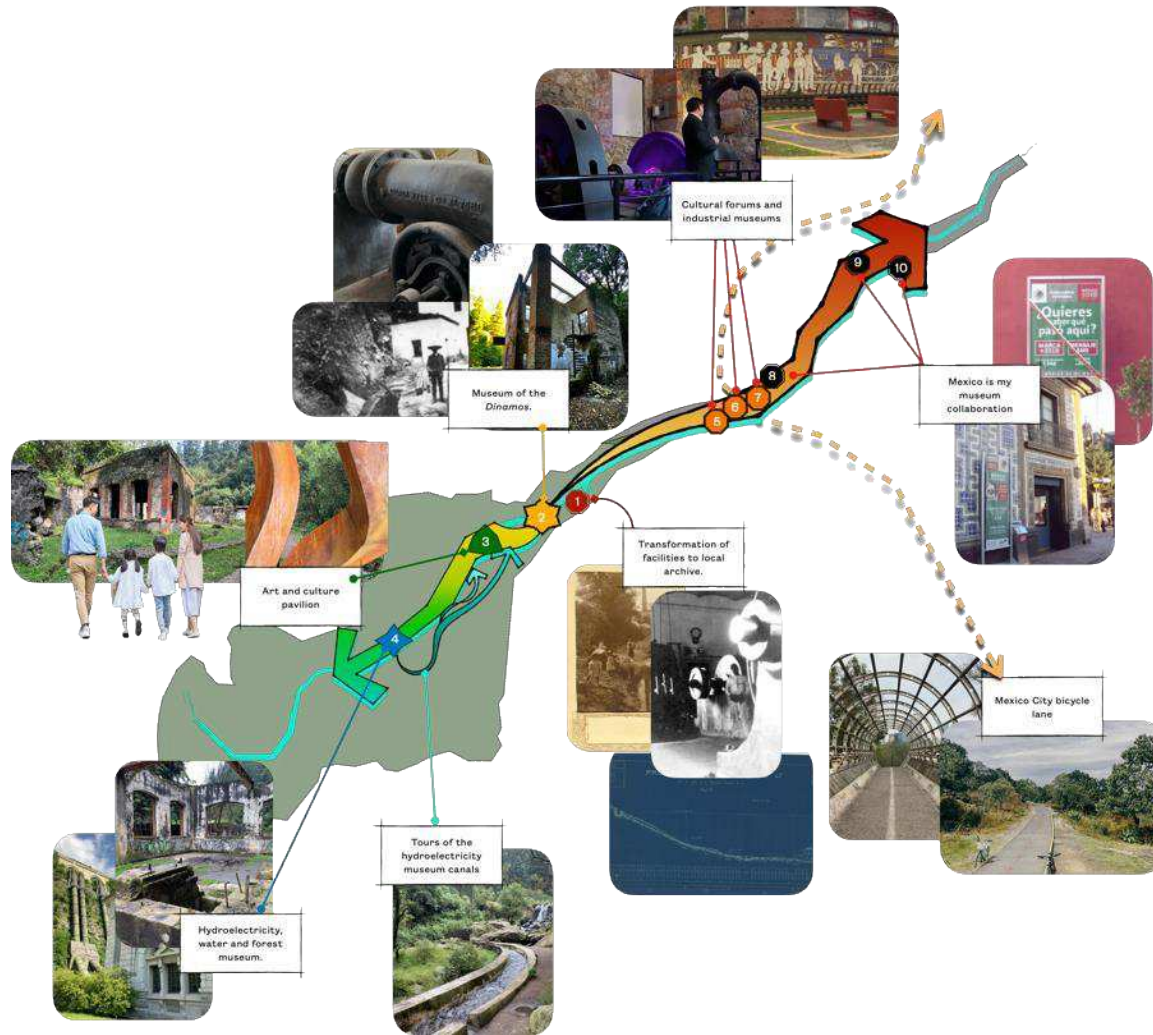
The fourth Dinamo could also be renovated and transformed into a museum dedicated to hydroelectricity, water and the forest. From this museum, guided walks could be organized along the Dinamos' canals to explain how they work and highlight the importance of preserving the park's natural resources.

The second connection point, which runs from the second Dinamo to the northeast, aims to link the elements of the industrial landscape that are still present. Particularly noteworthy are the Casa de las Bellas Artes, the Contreras Rail Station Museum and the El Águila Cultural Forum, which together with the two museums proposed within the park area, would form the cultural front of the industrial route. Through these sites and the development of a historical-narrative approach, we would seek to link the activities and workers' centers that used to operate and promote these facilities, as well as their relationship with the Magdalena River. The connection of the Contreras Station with the Mexico City bicycle path could be explored, creating an artery that connects users from the north and south of the city and forms part of the activities offered by this industrial route.

In order not to forget the historical and patrimonial connection of the site and finally connect the last three missing points marked in black on the map, where only Plaza Loreto stands out as a possible collaborator and financier of the project due to its character as a shopping mall, it is proposed to reinterpret a program implemented by the capital's government in 2010 called

"Mexico is my museum". In this program, through posters and banners placed throughout the country in historical sites and buildings, people were invited to call a telephone line that played an audio narrating the history of the place. In our case, we would seek to expose the same historical details using more modern technologies, such as the use of cell phones and free Internet connectivity offered in public spaces in the city, which could increase the success of this proposal.

Figure 72. Proposal for the reutilization and association of the industrial Landscape of the Magdalena River. Own elaboration.



**Proposal for the reutilization and association of the elements of the Magdalena River and the Dinamos.**

SYMBOLY			
	MAGDALENA RIVER		
	PROPOSED ANP - MAGDALENA RIVER BASIN		
	URBAN AREA		
	OUERNAVACA RAILWAY -CDMX CYCLEWAY		
	BREAK POINT - DINAMOS PARK ROUTE		
	BREAK POINT - THE INDUSTRIAL SYSTEM OF THE MAGDALENA RIVER ROUTE		
	ROUTE OF THE HYDROELECTRIC SYSTEM		
INDUSTRIAL HERITAGE ROUTE ELEMENTS			
	FIRST DINAMO		CONTRERAS STATION MUSEUM
	SECOND DINAMO		THE MAGDALENA CONTRERAS CULTURAL FORUM -EL ÁGUILA
	THIRD DINAMO		SANTA TERESA CHURCH AND SANTA TERESA FACTORY WALLS
	FOURTH DINAMO		IMSS CLINIC NO. 8 - LA HORMIGA FACTORY
	HOUSE OF FINE ARTS JUVENTINO ROSAS- LA MAGDALENA FACTORY		PLAZA LORETO SHOPPING CENTER -LORETO FACTORY
		Escale 0 500 1km	

#### IV. Conclusions of Chapter IV

This chapter aimed to provide a comprehensive overview of the challenges and opportunities in this field. It emphasizes the importance of collaboration between institutional actors, the need for an appropriate legal framework, and the exploration of new possibilities for the use of abandoned industrial landscapes.

The industrial landscape of *Los Dinamos* serves as an intriguing case study, due to its inclusion as an industrial landscape within a natural site that has protection. It highlights the differences in legal tools for heritage protection and management, as the complexity of cultural and heritage management policies in Mexico. The level of protection for the site in Mexico differs from that observed in France, both in terms of buildings and landscapes. This site, although abandoned, carries significant technical and heritage value, and implementing concrete protection measures could enhance its significance.

Although there is a rigid structure in the competences of action and management of heritage agents, there has always been a great national interest in the management of archaeological heritage, and more recently, industrial heritage has come to the fore<sup>184</sup>.

Finally, in the last part of the chapter, a compelling idea is presented: the establishment of both the Plan for the Safeguarding of the industrial Landscape of the Magdalena River and the subsequent Proposal for the reutilization and association of this landscape. These two proposals, if implemented in the case study, hold a great potential for the preservation, development and safeguarding of the heritage that composes it.

However, it is crucial to acknowledge the various complications that the territory presents on a broader scale before moving forward, considering the challenges that arise within the territory, we can effectively resolve uncertainties and provide solutions to existing complications. This requires adopting a defined denomination, and later a defined approach to develop a master plan, carefully orchestrated by the stakeholders involved in the protection of the region's heritage.

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<sup>184</sup> García Nelly, Corbett Jack, « Heritage Resource Management in Mexico», in *Cultural Heritage Management: a global perspective*, University press of Florida, 2011, chap. 8, p. 1.

Taking these necessary steps will not only ensure the success of the proposed plan but also enable us to navigate the complexities of the territory in a thoughtful and effective manner. Through a collaborative effort and a well-structured master plan, we can confidently overcome obstacles, preserve the industrial landscape's historical value, and achieve the desired transformation of the Magdalena River's industrial landscape.

## Final Conclusions.

The *Dinamos* of the Magdalena River in Mexico A route through the industrial heritage of the XIX century.

The present thesis has been a study on the *Dinamos* of the Magdalena River and the industrial landscape that comprises it. Throughout the process, detailed identification and analysis have been successfully conducted, fulfilling the objectives of recognizing the elements that constituted the industrial landscape of the Magdalena River, highlighting its importance, its influence on societal development, and the value of its remnants.

The results of our study reveal the unique characteristics of the study area, making this industrial landscape one-of-a-kind in Mexico City. No other location possessed the biophysical features provided by the Magdalena River basin, which enabled the development of industry along its course. Initially, water-powered mills and textile workshops were established, utilizing the mechanical force of the river. Subsequently, the area witnessed modernization and the addition of industrial centers in the outskirts. These expansions were now driven not only by the natural resources obtained but also by the successive industrial revolutions that symbolized technological innovation, knowledge transfer, the fusion of techniques, and the adaptation and transmission of knowledge.

Enabling the construction of the *Dinamos* in a system of cascading hydroelectric plants in the upper part of the Magdalena River, and the establishment of multiple factories, textile mills, and paper mills, which had a significant impact on the social and cultural development of the territory.

Thanks to the research conducted in the archives and map library, valuable iconographic materials were found, allowing for the analysis and description of the system and its elements. It was possible to identify the engineer behind the development of the *Dinamos*, the distinguished Miguel Angel de Quevedo y Zubieta, a spokesperson for industrial development and the preservation of natural wealth. Additionally, the renowned architects Alberto Pani and Arturo Pani, along with their group of workers, whose presence was previously unknown at the study site.

The type of machinery that operated in the *Dinamos*, the functioning of the hydroelectric system, and the reasons for its construction were determined.

Highlighting the fact that the construction was heavily influenced by the group of entrepreneurs of French origin that flourished under the political conditions set forth in the work known as the *barcolentes*, among whom Mr. Robert, Meyran, Veyan, and Donnadiou stood out. With their business model, they expanded the textile influence in the southern part of the city.

As a result of this development and productivity, the area became a stop for the Cuernavaca railroad, having its peak of growth and also later, the reasons for the industry's decline are explored.

Furthermore, in line with the objectives, the elements that make up this industrial landscape in the present were identified, including their location, current use, state of preservation, and description.

Likewise, through our study, the issues related to the protection of industrial heritage in Mexico were addressed. The unique protection conditions at the study site regarding this matter were highlighted, aiding in a better understanding of the implications involved.

Finally, proposals for safeguarding this important historical site that remains in the southern part of the city were explored, providing new perspectives and approaches that can have a significant impact on decision-making and the improvement of the industrial landscape in the Magdalena River and its *Dinamos*.

This research opens up possibilities for project development and interventions, and it is expected that the generated information will serve as a foundation for further investigations, expanding the available knowledge about the *Dinamos* and the rest of the industrial landscape of the Magdalena River. Consequently, it contributes to their preservation. Of course, there is room to expand this information as this thesis was conducted with the limitations posed by the Covid pandemic, which made it challenging to access and consult archival materials.

Finally, I would like to conclude by emphasizing the enormous historical and natural value that this site possesses, and to reiterate the importance of protecting this heritage, not only for the city's residents but also for the cultural significance it holds for those who inhabit or visit the area, creating a sense of place and memory.



## Conclusions finales

Les Dinamos du fleuve Magdalena au Mexique Un itinéraire à travers l'héritage industriel du XIXe siècle.

La présente thèse est une étude sur le Dinamos du fleuve Magdalena et le paysage industriel qui le compose. Tout au long du processus, une identification et une analyse détaillées ont été menées à bien, remplissant les objectifs de reconnaissance des éléments qui ont constitué le paysage industriel du fleuve Magdalena, soulignant son importance, son influence sur le développement de la société et la valeur de ses vestiges.

Les résultats de notre étude révèlent les caractéristiques uniques de la zone étudiée, qui font de ce paysage industriel un cas unique dans la ville de Mexico. Aucun autre endroit ne possédait les caractéristiques biophysiques du bassin du fleuve Magdalena, qui ont permis le développement de l'industrie le long de son cours. Dans un premier temps, des moulins à eau et des ateliers textiles ont été créés, utilisant la force mécanique du fleuve. Par la suite, la région s'est modernisée et des centres industriels ont vu le jour dans la périphérie. Ces expansions sont désormais motivées non seulement par les ressources naturelles obtenues, mais aussi par les révolutions industrielles successives qui symbolisent l'innovation technologique, le transfert de connaissances, la fusion des techniques, l'adaptation et la transmission des savoirs.

Il a permis la construction des Dinamos dans un système de centrales hydroélectriques en cascade dans la partie supérieure du fleuve Magdalena, et l'établissement de nombreuses usines, fabriques de textiles et papeteries, qui ont eu un impact significatif sur le développement social et culturel du territoire.

Grâce aux recherches menées dans les archives et la cartothèque, de précieux matériaux iconographiques ont été trouvés, permettant l'analyse et la description du système et de ses éléments. Il a été possible d'identifier l'ingénieur à l'origine du développement des Dinamos, l'éminent Miguel Angel de Quevedo y Zubieta, porte-parole du développement industriel et de la préservation des richesses naturelles. En outre, les célèbres architectes Alberto Pani et Arturo Pani, ainsi que leur groupe d'ouvriers, dont la présence était jusqu'alors inconnue sur le site d'étude.

Le type de machines qui fonctionnaient dans les Dinamos, le fonctionnement du système hydroélectrique et les raisons de sa construction ont été déterminés.

Il faut souligner que la construction a été fortement influencée par le groupe d'entrepreneurs d'origine française qui a prospéré dans les conditions politiques de l'œuvre connue sous le nom

de barcolentes, parmi lesquels se distinguent MM. Robert, Meyran, Veyan et Donnadiou. Avec leur modèle d'entreprise, ils ont étendu l'influence du textile dans la partie sud de la ville.

Grâce à ce développement et à cette productivité, la région est devenue une halte pour le chemin de fer de Cuernavaca, qui a connu son apogée et, plus tard, les raisons du déclin de l'industrie sont explorées.

En outre, conformément aux objectifs, les éléments qui composent ce paysage industriel actuel ont été identifiés, y compris leur emplacement, leur utilisation actuelle, leur état de conservation et leur description.

De même, notre étude a permis d'aborder les questions liées à la protection du patrimoine industriel au Mexique. Les conditions de protection particulières du site étudié à cet égard ont été mises en évidence, ce qui a permis de mieux comprendre les implications de cette question.

Enfin, des propositions de sauvegarde de cet important site historique situé dans la partie sud de la ville ont été explorées, offrant de nouvelles perspectives et approches qui peuvent avoir un impact significatif sur la prise de décision et l'amélioration du paysage industriel du fleuve Magdalena et de ses Dinamos.

Cette recherche ouvre des possibilités de développement de projets et d'interventions, et l'on s'attend à ce que les informations générées servent de base à d'autres recherches, élargissant les connaissances disponibles sur les Dinamos et le reste du paysage industriel du fleuve Magdalena. Par conséquent, elles contribueront à leur préservation. Bien entendu, il est possible d'élargir ces informations, car cette thèse a été réalisée en tenant compte des limites imposées par la pandémie de Covid, qui a rendu difficile l'accès et la consultation des documents d'archives.

Enfin, je voudrais conclure en soulignant l'énorme valeur historique et naturelle que possède ce site, et réitérer l'importance de protéger ce patrimoine, non seulement pour les habitants de la ville, mais aussi pour la signification culturelle qu'il revêt pour ceux qui habitent ou visitent la région, en créant un sens du lieu et de la mémoire.

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# Appendix

**Appendix 1.** Screenshot in the web site of the INAH where the *Dinamos* are presented as an historical monument.

MONUMENTO HISTÓRICO	MONUMENTO HISTÓRICO	MONUMENTO HISTÓRICO	MONUMENTO HISTÓRICO	MONUMENTO HISTÓRICO
				
I-0014200088	I-0014200089	I-0014200090	I-0014200091	I-0014200092
<b>Primer Dinamo</b> Inmueble Ingeniería Civil	<b>Segundo Dinamo</b> Inmueble Ingeniería Civil	<b>Tercer Dinamo</b> Inmueble Ingeniería Civil	<b>Cuarto Dinamo</b> Inmueble Ingeniería Civil	<b>Puente del 40.º dinamo</b> Inmueble Ingeniería Civil
Ciudad de México, La Magdalena Contreras, La Magdalena Contreras Núm. ext. Sin número Siglo XIX	Ciudad de México, La Magdalena Contreras, La Magdalena Contreras Núm. ext. Sin número Siglo XIX	Ciudad de México, La Magdalena Contreras, La Magdalena Contreras Núm. ext. Sin número Siglo XIX	Ciudad de México, La Magdalena Contreras, La Magdalena Contreras Núm. ext. Sin número Siglo XIX	Ciudad de México, La Magdalena Contreras, La Magdalena Contreras Núm. ext. Sin número Siglo XIX

It also shows the capture number under which they are registered in the Civil Engineering property records.  
Source: Instituto Nacional de Antropología e Historia, Consulta Pública del Catálogo Nacional de Monumentos Históricos Inmuebles

<https://catalogonacionalmhi.inah.gob.mx/consultaPublica>. Consulted: 19.nov.2021 viewed: 8.mar.2023

## Appendix 2. La Magdalena Factory.



Source: Mediateca INHA

**Appendix 3. Roofing with "Celotex". La Magdalena, Contreras D.F., Mexico City.**



Source: Mediateca INHA

**Appendix 4. Cultural forum cultural "El Águila".**



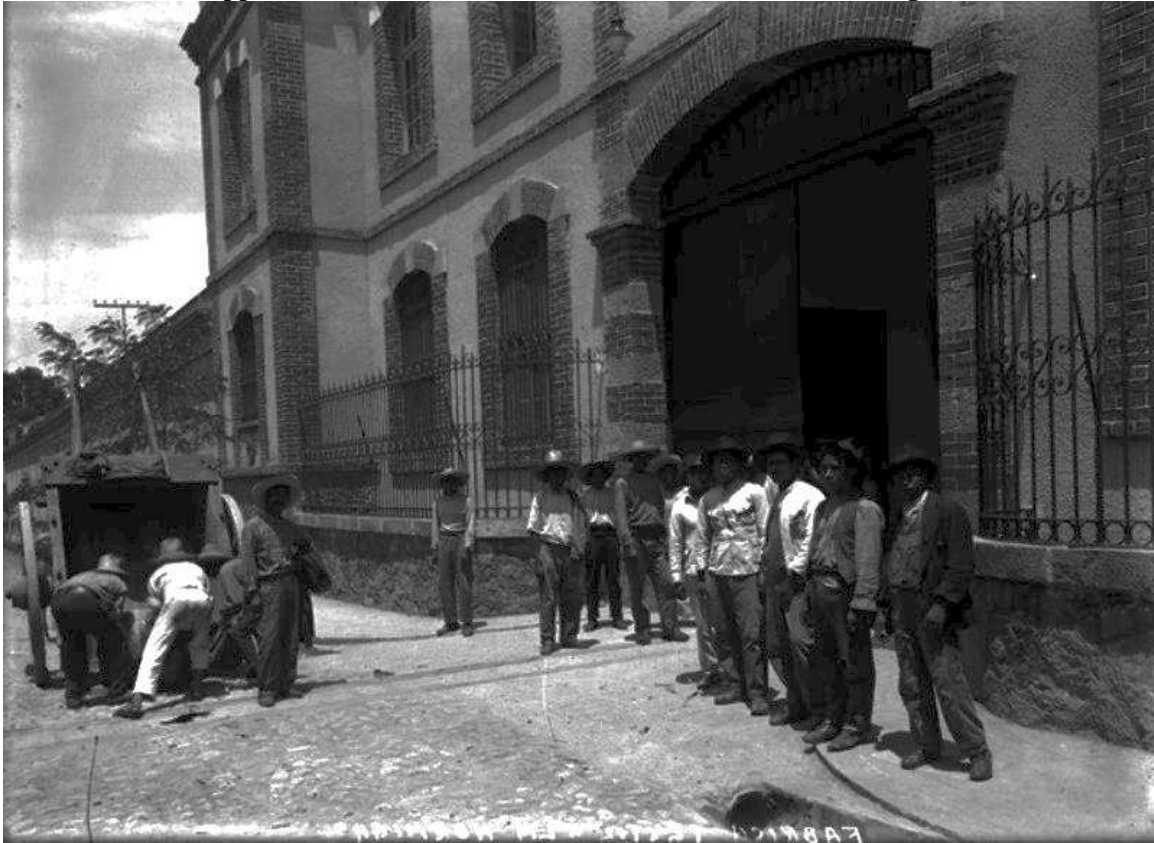
Source: G.D.F, Coordinación de cultura en La Magdalena Contreras.

**Appendix 5. Women and girls next to a river, landscape, La Hormiga factory.**



Source: Mediateca INAH

**Appendix 6. Workers outside the "Fábrica textil La Hormiga".**



Source: Mediateca INAH



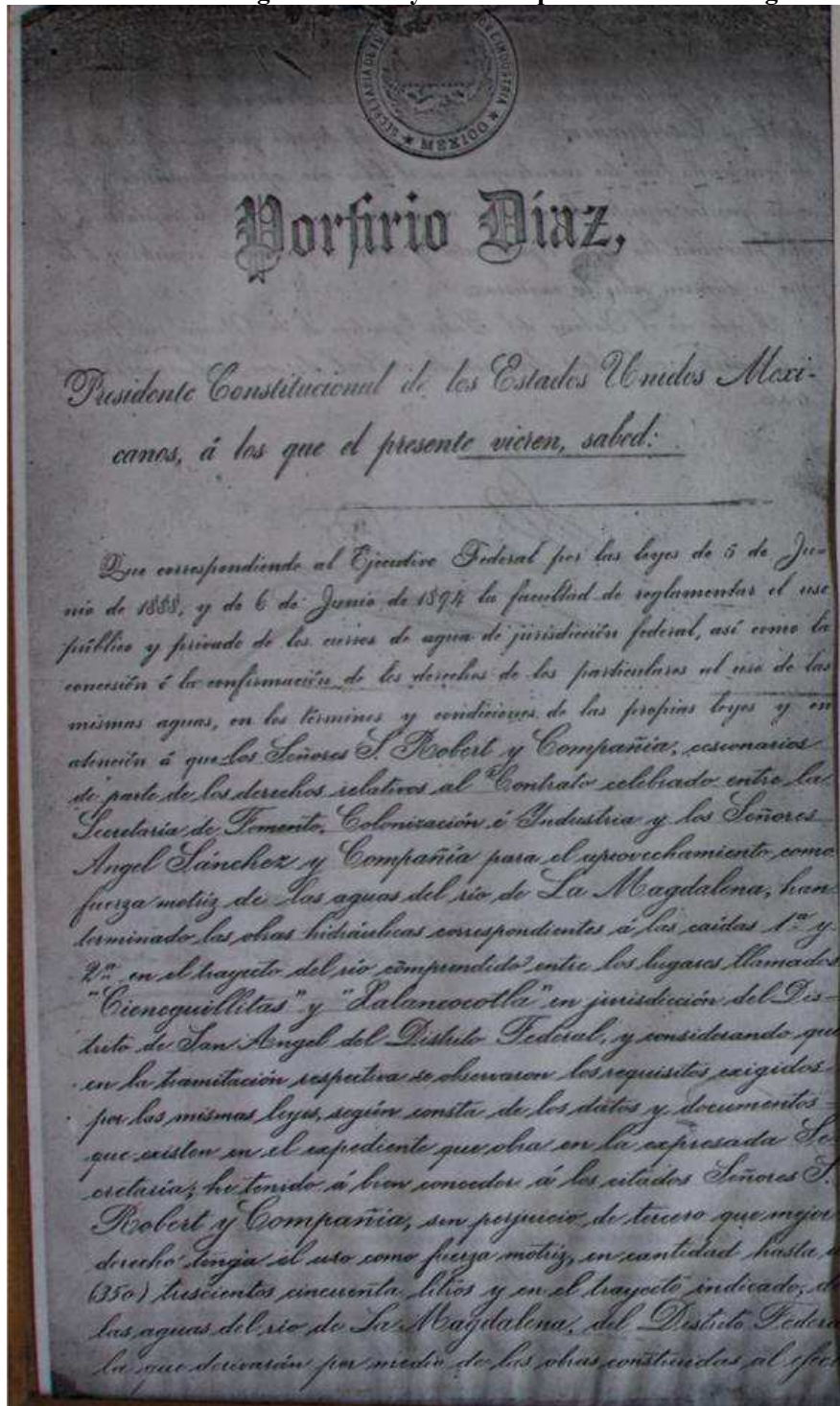
**Appendix 7. Santa Teresa Factory around 1933.**



Source: Alfonso Arredondo From:

<https://m.facebook.com/HISTORIAEIMAGENCONTRERAS/photos/a.650493255155852/1484231235115379/?type=3>

Appendix 8. Concession of rights for the hydraulic exploitation of the Magdalena River.



... y si las demás de la República, no  
pongan obstáculo alguno á los mencionados Señores S. Robt  
bert y Compañia en el ejercicio del derecho que han adquirido, si-  
no que antes bien los mantengan en el libre uso, aprovechamiento y po-  
sesión que les corresponden, con la obligación por su parte de sujetarse á lo  
que previenen las leyes, reglamentos y demás disposiciones vigentes y á las  
que se dictaren sobre la materia.

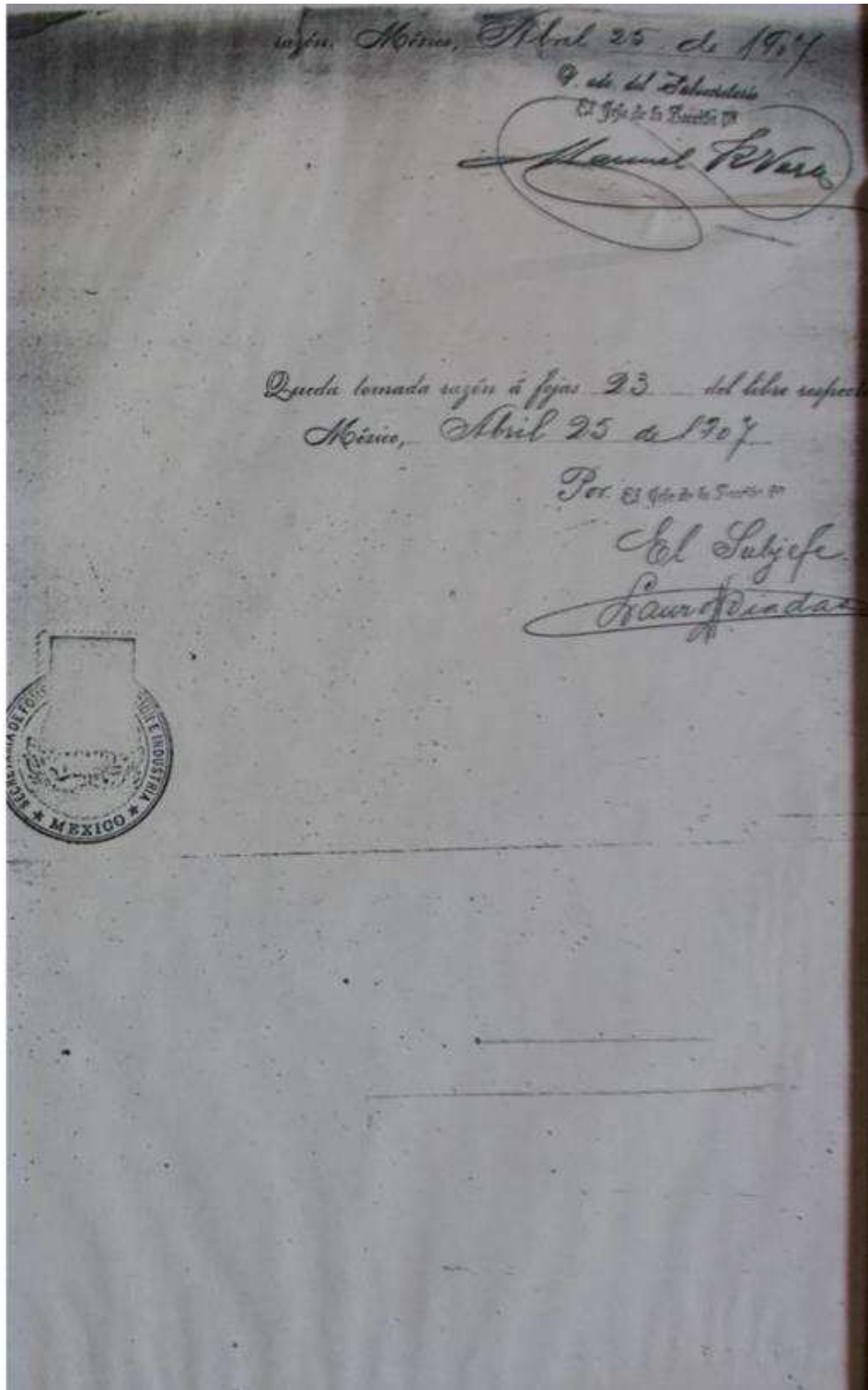
Dado en el Palacio del Poder Ejecutivo de la Unión en México,  
á los diez y ocho días del mes de Abril de un mil novecientos  
siete.

Porfirio Díaz

P. a. del Secretario.

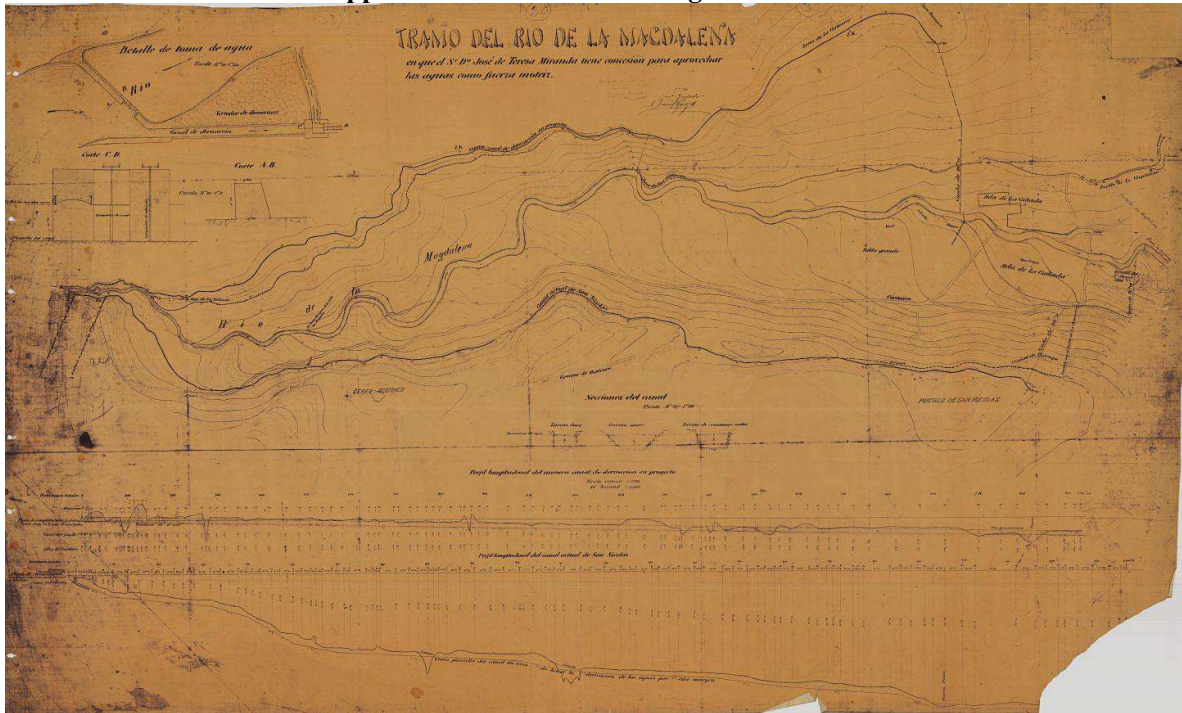
Andrés Aldasoro

Título del derecho al uso y aprovechamiento (de) como fuerza me-  
triz de las aguas del Rio de la Magdalena, del  
Distrito Federal  
á favor de los Señores S. Robert y Compañia.



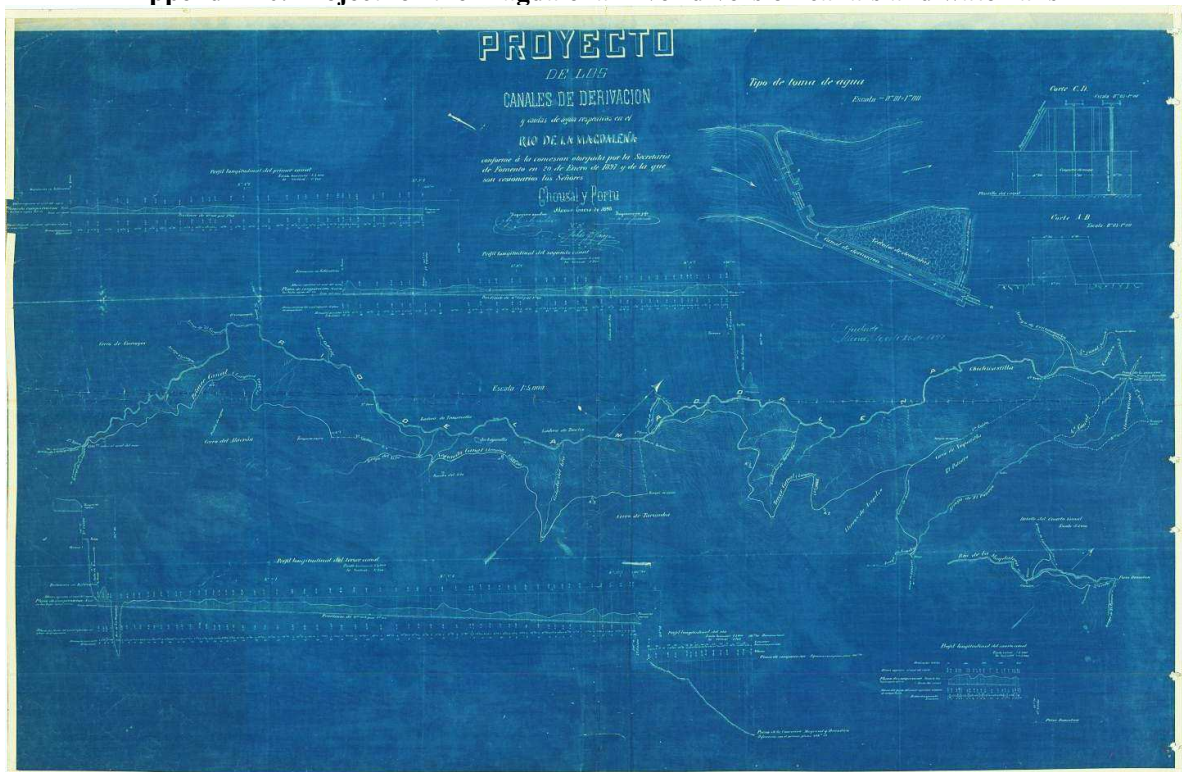
Source: Second Dinamo interior, own photographs.

**Appendix 9. Section of the Magdalena River.**



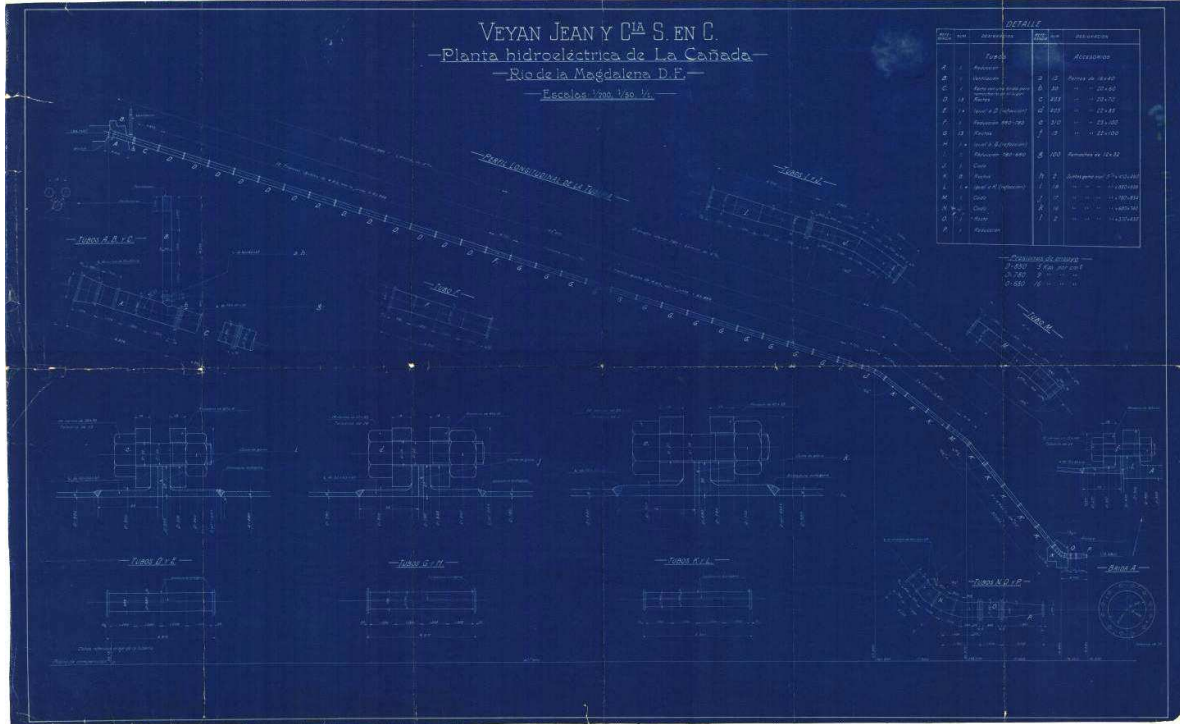
It can be appreciated the plan that corresponds to the first Dinamo. Source: Mapoteca Digital Orozco y Berra

**Appendix 10. Project for the Magdalena River diversion canals and waterfalls**



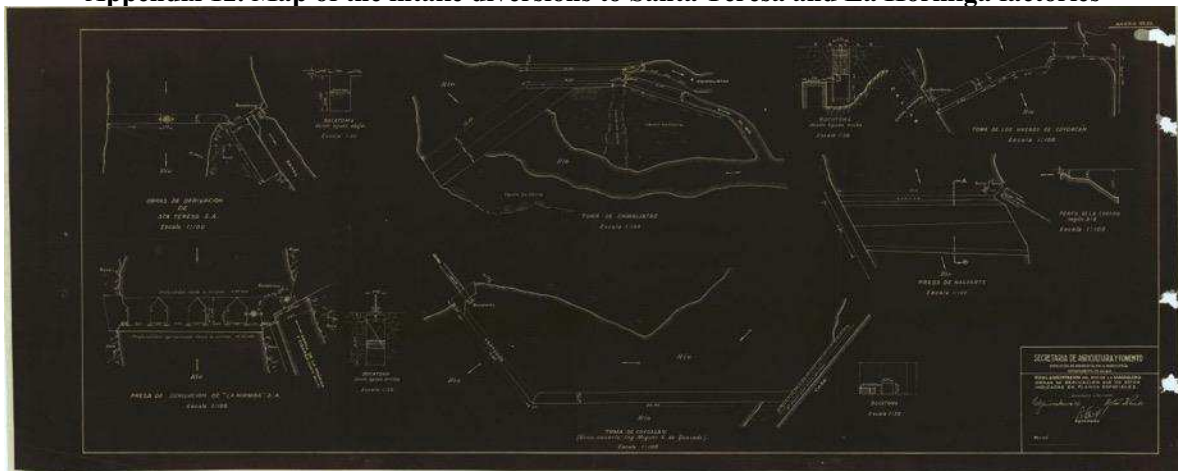
Source: Mapoteca Digital Orozco y Berra.

**Appendix 11. Profile plan of the water fall of the hydroelectric plant of La Cañada, or 1st Dinamo.**



Source: Mapoteca Digital Orozco y Berra.

**Appendix 12. Map of the intake diversions to Santa Teresa and La Hormiga factories**



Source: Mapoteca Digital Orozco y Berra.



Appendix 15. Clipping from the newspaper El Financiero Mexicano.

**FERROCARRIL**  
—DE—  
**MEXICO A CUERNAVACA Y EL PACIFICO.**

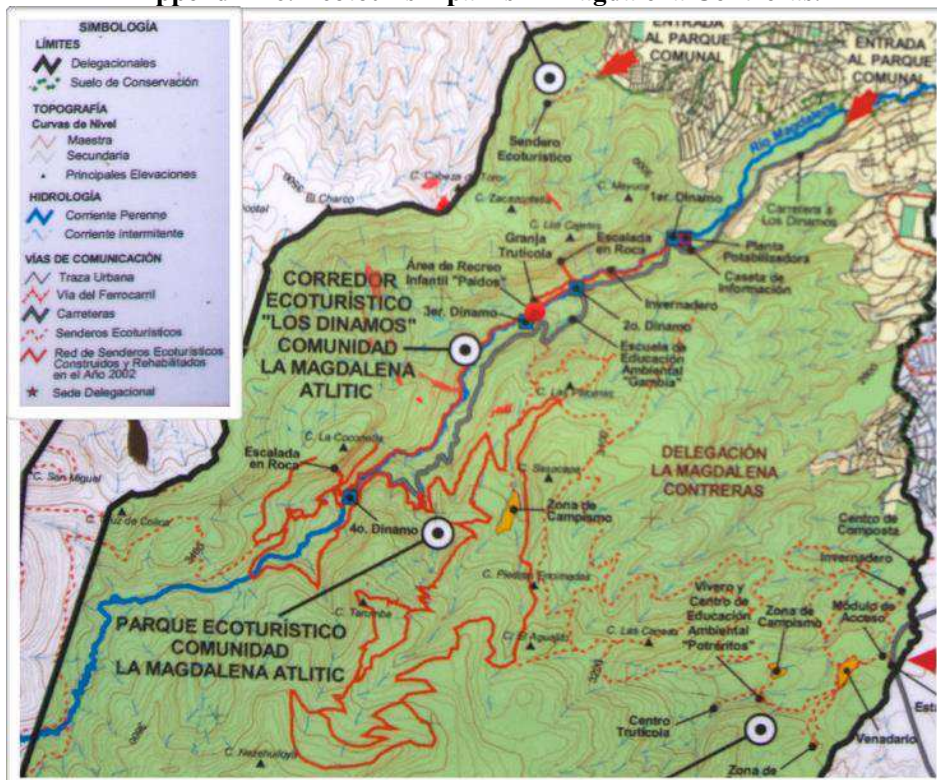
**ITINERARIO No. 7.**  
**COMIENZA A REGIR A LAS 6 A. M. EL 12 DE FEBRERO DE 1896.**  
TODOS LOS ITINERARIOS ANTERIORES QUEDAN NULIFICADOS.

RUMBO AL SUR.		ESTACIONES.	RUMBO AL NORTE.	
No. 1. Mixto. Diariamente excepto los domingos.	Kilometros Desde Mexico.		Kilometros Desde Tres Marias.	No. 2. Mixto. Diariamente excepto los domingos.
7.15 a. m.	0	S. México. Ll.	74.1	4.30 p. m.
7.27	4.6	4.6 Santa Julia.	69.5	4.18
7.50	12.2	7.6 Tacubaya.	61.9	3.56
8.02	16.1	3.9 Mixcoac.	58.0	3.40
8.18	21.9	5.8 El Olivar.	52.2	3.25
8.37	28.2	6.3 Contreras.	45.9	2.57
8.47	30.7	2.5 Eslava.	43.4	2.50
9.44	46.1	15.4 Ajusco.	28.0	2.05
10.30	61.4	15.3 La Cima.	12.7	1.20
11.15 a. m.	74.1	12.7 Ll. Tres Marias. S.	.0	12.30 p. m.

CONEXIONES.—En Tres Marias con la Empresa de Diligencias Generales para Cuernavaca.

Which shows the itinerary for the month of February, with the stations of the Mexico Cuernavaca railroad, which are in operation, including the Contreras station. Source: Hemeroteca Universidad Autónoma de Nuevo León, Fondo: Historia, Identifier: 2006290, Newspaper The Mexican Financier, 1897, Vol 29, No 16, January 02.

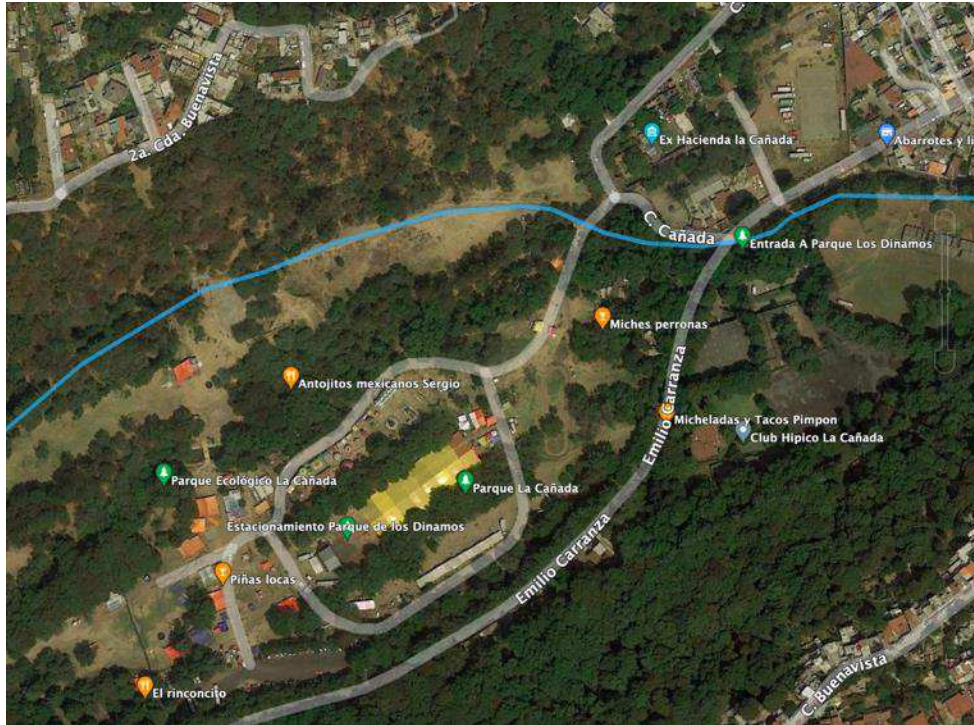
Appendix 16. Ecotourism parks in Magdalena Contreras.





**Components of the ecotourism corridor "Los Dinamos". Source:Gobierno del distrito Federal, Alcaldía de La Magdalena Contreras, Direccion General de Medio Ambiente y Ecología. Source: Own photography on site.**

**Appendix 17. La Cañada park east of the first Dinamo.**



Easily accessible by public transport and has refreshment points. It has a wide area to practice recreational activities, like, picnics, cycling, horseback riding, even climbing or zip-lining, and has access to the Magdalena River. Source: **Google Earth.**

**Appendix 18. Commercial premises registered within the *Los Dinamos* section of the study area.**

Id	Name	Description of the Economic Sector	Latitude	Longitude
930838	CRIADERO DE TRUCHAS	Piscicultura y otra acuicultura, excepto camaronicultura	19.28888889	-99.26444444
930747	CRIADERO DE TRUCHAS RANCHO LA ROSITA	Piscicultura y otra acuicultura, excepto camaronicultura	19.28433250	-99.27448806
1015883	PLANTA POTABILIZADORA RIO MAGDALENA	Captación, tratamiento y suministro de agua realizados por el sector público	19.28888889	-99.26444445
9345121	PALETERIA Y NEVERIA LOS DINAMOS	Elaboración de helados y paletas	19.30231712	-99.24584726
7674574	PANADERIA CITLALI	Panificación tradicional	19.29453941	-99.25691947
7674575	CARPINTERIA SIN NOMBRE	Fabricación de productos de madera para la construcción	19.29473157	-99.25585896
8564968	CARPINTERIA SIN NOMBRE	Fabricación de productos de madera para la construcción	19.29458846	-99.25641285
9106592	ANTOJITOS CABAÑITA LOS DOS CORCELES	Comercio al por menor de bebidas no alcohólicas y hielo	19.28433250	-99.27448806
6316728	BA EXPRESS PLAZA LOS DINAMOS 3265	Comercio al por menor en supermercados	19.30616758	-99.23789844
930821	DULCES LAURA	Comercio al por menor de dulces y materias primas para repostería	19.28433250	-99.27448806
930819	DULCES Y REFRESCOS MAGO	Comercio al por menor de dulces y materias primas para repostería	19.28433250	-99.27448806

930782	MISCELANEA FANNY	Comercio al por menor en tiendas de abarrotes, ultramarinos y misceláneas	19.29452804	- 99.25706161
931629	SIX DINAMOS	Comercio al por menor de cerveza	19.30442009	- 99.24388535
7674573	ALCOHOLICOS ANONIMOS PRIMER PASO CAZULCO	Agrupaciones de autoayuda para alcohólicos y personas con otras adicciones	19.29505865	- 99.25473293
930754	PESCA RECREATIVA INFANTIL	Clubes o ligas de aficionados	19.28433250	- 99.27448806
930831	ANTOJITOS CABAÑA EL MANANTIAL	Restaurantes con servicio de preparación de antojitos	19.28433250	- 99.27448806
1015885	ANTOJITOS CABAÑA EL PERICO Y YO	Restaurantes con servicio de preparación de antojitos	19.26647778	- 99.29346000
930836	ANTOJITOS CABAÑA LA GUERA	Restaurantes con servicio de preparación de antojitos	19.28433250	- 99.27448806
930750	ANTOJITOS CABAÑA LA SUBIDITA	Restaurantes con servicio de preparación de antojitos	19.28433250	- 99.27448806
930753	ANTOJITOS CABAÑA LOS ARBOLITOS	Restaurantes con servicio de preparación de antojitos	19.28433250	- 99.27448806
8564976	ANTOJITOS CABAÑA QUETZAL	Restaurantes con servicio de preparación de antojitos	19.28433250	- 99.27448806
930818	ANTOJITOS CABAÑITA AGUSTINITA	Restaurantes con servicio de preparación de antojitos	19.28433250	- 99.27448806
930828	ANTOJITOS CABAÑITA CHARLY	Restaurantes con servicio de preparación de antojitos	19.26647778	- 99.29346000
1015886	ANTOJITOS CABAÑITA DOÑA MARY	Restaurantes con servicio de preparación de antojitos	19.26647778	- 99.29346000
930834	ANTOJITOS CABAÑITA EL CHAGO	Restaurantes con servicio de preparación de antojitos	19.28433250	- 99.27448806
930820	ANTOJITOS CABAÑITA EL CHARRITO	Restaurantes con servicio de preparación de antojitos	19.28433250	- 99.27448806
930824	ANTOJITOS CABAÑITA EL GALLO GIRO	Restaurantes con servicio de preparación de antojitos	19.28433250	- 99.27448806
1015884	ANTOJITOS CABAÑITA EL MIRADOR	Restaurantes con servicio de preparación de antojitos	19.26647778	- 99.29346000
930837	ANTOJITOS CABAÑITA EL PATITO FELIZ	Restaurantes con servicio de preparación de antojitos	19.28138944	- 99.27841000
930832	ANTOJITOS CABAÑITA EL RINCONCITO	Restaurantes con servicio de preparación de antojitos	19.28433250	- 99.27448806
930835	ANTOJITOS CABAÑITA LOS ORGANITOS	Restaurantes con servicio de preparación de antojitos	19.28433250	- 99.27448806
1015882	ANTOJITOS EL PARAISO DE LA TRUCHA	Restaurantes con servicio de preparación de antojitos	19.28138944	- 99.27841000
7924469	ANTOJITOS LOS ARBOLITOS II	Restaurantes con servicio de preparación de antojitos	19.28433250	- 99.27448806
930830	ANTOJITOS MEXICANOS EL MIRADOR	Restaurantes con servicio de preparación de antojitos	19.28433250	- 99.27448806
8564975	ANTOJITOS MEXICANOS EL RINCON DE CIHUATLI DE CHICONOAPAN	Restaurantes con servicio de preparación de antojitos	19.28138944	- 99.27841000
7923652	ANTOJITOS MEXICANOS TEPOZAN	Restaurantes con servicio de preparación de antojitos	19.28433250	- 99.27448806
7924468	CABAÑA CHICONOAPAN POSTRES Y FRITURAS	Servicios de preparación de otros alimentos para consumo inmediato	19.28138944	- 99.27841000
8564978	CABAÑA EL SABROSO POLLO	Restaurantes con servicio de preparación de antojitos	19.28433250	- 99.27448806
1015880	CABAÑAS ECOTURISMO EL HUERTO	Restaurantes con servicio de preparación de alimentos a la carta o de comida corrida	19.28138944	- 99.27841000
8386926	CABAÑITA LAS MAMALONAS II	Restaurantes con servicio de preparación de antojitos	19.28433250	- 99.27448806
8386924	FUENTE DE SODAS Y FRITURAS	Cafeterías, fuentes de sodas, neverías, refresquerías y similares	19.28433250	- 99.27448806

8564972	LA RIVERA DEL TIBURON II	Restaurantes con servicio de preparación de antojitos	19.28433250	- 99.27448806
8564977	RESTAURANT RANCHO LA ROSITA	Restaurantes con servicio de preparación de antojitos	19.28433250	- 99.27448806
1015881	RESTAURANTE CABAÑA EL JACALITO	Restaurantes con servicio de preparación de alimentos a la carta o de comida corrida	19.28138944	- 99.27841000
930749	RESTAURANTE CABAÑITA MAGY	Restaurantes con servicio de preparación de alimentos a la carta o de comida corrida	19.28433250	- 99.27448806
930748	RESTAURANTE LA RIVERA DEL TIBURON	Restaurantes con servicio de preparación de alimentos a la carta o de comida corrida	19.28433250	- 99.27448806
8564979	VENTA DE MICHELADAS LAS MAMALONAS DE IVONNE	Bares, cantinas y similares	19.28433250	- 99.27448806
8386925	BAÑOS PUBLICOS	Sanitarios públicos y boquerías	19.28433250	- 99.27448806
930752	PAIDOS CAMPAMENTO	Asociaciones y organizaciones civiles	19.28138944	- 99.27841000
7923651	SANITARIOS PUBLICOS	Sanitarios públicos y boquerías	19.28433250	- 99.27448806
930822	SANITARIOS PUBLICOS SIN NOMBRE	Sanitarios públicos y boquerías	19.28433250	- 99.27448806
1011163	AREA DE PROXIMIDAD MAC 2 DINAMO	Impartición de justicia y mantenimiento de la seguridad y el orden público	19.30043710	- 99.23414620
930742	CASETA CUARTO DINAMO	Regulación y fomento de actividades para mejorar y preservar el medio ambiente	19.26647778	- 99.29346000

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