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Economic sustainability scenarios for the redevelopment of sports facilities: a proposal for the “Fausto Coppi” Motovelodrome in Turin

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Abstract The recovery of sports facilities, especially those considered particularly interesting from an historical and cultural perspective, appears today as one of the main challenges to the enhancement of the architectural heritage. In fact, alongside the issues linked to the maintenance of their formal characteristics, the conversion of these spaces into flexible, multifunctional and modern facilities is central to ensuring the economic sustainability of their management, increasingly entrusted to private investors. This paper presents a hypothesis for the enhancement of the Fausto Coppi Motovelodrome in Turin, a famous facility which was a landmark for cycling and sports lovers in the past century. Together the enhancement of the existing structures, the design proposal provides for the addition of a new building for sports and commercial use. The methodology applied aims at evaluating the benefits of the proposal through a preliminary estimate of the construction costs and the definition of a catchment area and of a possible management scheme, with its costs and revenues. Finally, by simulating alternative scenarios, the incidence of the increase of the commercial surface on the revenues is explored. Lastly, by pointing out which possible future scenarios are plausible for the recovery of the site, the main design proposal relates to the Feasibility Study and the Call for the assignment of the Motovelodrome, published by the Municipality of Turin in February 2020.

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1 | INTRODUCTION

Sports architectures, originally conceived as “urban facts”, “primary elements” of the architecture of a city (Rossi, 1966), retain the distinctive characteristics of “definitive and exemplary architecture” (De Finetti, 1934). As such, the redevelopment of sports facilities — especially of those considered “historic” or formally protected — appears intrinsically complex. In fact, on the one hand, it would not be possible to take into consideration a consistent intervention by the public sector for the redevelopment or the direct management of these facilities; on the other hand, the initiatives of private investors should always be strictly aimed at respecting and preserving the historical and architectural identity of these artifacts. The space flexibility and a certain degree of multifunctionality and diversification of the sports and cultural offer within the facilities constitute the horizon within which to place actions for a sustainable recovery of these infrastructures.

In addition, the progressive change of the users’ profile — from simple “fans” to “customers” (Faroldi, 2019) — requires a formal and managerial adaptation of sports plants. In fact, the project of a sports infrastructure identifies sport and its spaces as a cultural asset, be it an intervention from scratch or a redevelopment one. As such, it is traceable to a complex system (Faroldi, 2020), considering its physical dimensions (which are often not comparable with the morphology of the surrounding urban fabric, when it is located in a consolidated context), the advanced infrastructures it needs (when located outside the urban context) and for the material and immaterial relations that it generates. The design of a sports infrastructure therefore often offers opportunities for “the transformation and strategic re-evaluation of the city and the landscape” (Faroldi, 2020). With this in mind, then, a stadium is no longer just a stadium, and a velodrome is no longer just a velodrome. Since the end of the last century, the increasing opening of these facilities to users (who gradually have been feeling safer in these spaces) allowed the survival of a part of the sports built heritage. In fact, it has been reconfigured as urban place of sociality, intended for families and bearers of renewed instances (Faroldi, 2019). Last but not least, the rehabilitation of historical facilities is now a driving force for the interception of events on a national and international scale, together with the promotion of the image of the city as an “Eventful City”, which is a city that focuses on sports events as part of an articulated development strategy (Bondonio *et al.*, 2018).

In the case of velodromes, historically appointed to host track cycling races, people have been showing a renewed interest in them for the last couple of decades (Bozzuto, 2018), supported by the global growth of the cycling movement. In Italy, although they are numerous (there are more than fifty facilities) (Pozzaglio and Trane, 2019), the historic velodromes are in critical conditions. The main reasons for their general state of deterioration are: (1) the lack of adequate public resources for their rehabilitation; (2) the diminished interest in (track) cycling in the last decades of the twentieth century; (3) the lack of a particularly rooted cycling culture in our country; (4) the lack of space flexibility in sports plants, with relevant consequences from a managerial and economic point of view.

The general aim of this paper is to assess which is the most suitable scenario for the redevelopment of a big sports facility in Turin, Italy: the historical “Fausto Coppi” Motovelodrome. The assessment was carried out according to the guidelines published in the “Exploratory Notice” by the Municipality of Turin (April 2018). Actually, in some cases we proposed alternative (or most suitable) solutions, in order to grant the financial sustainability of the redevelopment project. The economic feasibility scenarios were also evaluated with respect to some key aspects, such as the possibility to increase the Gross Floor Area in the plant and to establish the share of it to destinate to commercial purposes. As for the structure of the paper, the second paragraph focuses on the main issues related to the

redevelopment of sports facilities as part of the built heritage; the third paragraph illustrates the methodology applied and the specific objectives of the research; the fourth paragraph introduces the case study, together with the design proposal for its reuse; in the fifth paragraph we discuss the results of the simulation and evaluate alternative design and financial scenarios; the sixth paragraph summarizes the phases towards the entrust of the facility, after the publication of the Exploratory Notice until the public auction (February 2020); the seventh paragraph concludes the paper.

2 | HERITAGE REDEVELOPMENT: THE CASE OF SPORTS FACILITIES

The recovery of the historical heritage, quantitatively consistent and often steeped in cultural and architectural value (although degraded on a physical and functional level) constitutes “a current topic increasingly debated in the disciplinary fields of restoration, technology and economic evaluation”(Curto *et al.*, 2020). However, the economic sustainability of redevelopment projects must also be investigated in two different ways, depending on whether or not the original function of the heritage keeps on being the same (Curto *et al.*, 2020). In particular, the reuse of Modern heritage does not yet seem to have reached a shared position with regard to the values to be safeguarded. In Turin, as an example, valuable architectural complexes dating back to the twentieth century are numerous. They could be enhanced and re-proposed only according to renewed functions and uses, within a radically changed urban context (Baietto, 2019). In the Italian context, however, especially after the international financial and real estate crisis of 2006, recovery interventions must increasingly deal with real estate values which are so low that they cannot even justify reuse investments (Curto *et al.*, 2020).

In the case of the sports heritage, the value of the facilities, as well as being intrinsic and material, is also to be found in its intangible component, linked to territorial promotion and marketing processes (Guala, 2018). Their aim is to attract new economic and productive activities to a specific area, by promoting the development of local businesses and its positive image through investments linked to the improvement of the quality of life of the local community (Kotler *et al.*, 1993). Therefore, the rehabilitation of sports heritage always constitutes an opportunity, since it can reduce its maintenance costs even drastically (Galiano-Garrigos *et al.*, 2019), improve its technological and energetical efficiency and generally reintegrate it within the urban system. It is estimated, in fact, that the operating, maintenance and replacement costs of a building may even make up more than 80% of the total cost of the entire life cycle (Boussabaine and Kirkham, 2004); 38.7% of energy consumption in the European Union is destined for the needs of residential, commercial and institutional buildings (Munarim and Ghisi, 2016), up to 70% if only electricity consumption is considered (Bajenaru *et al.*, 2016). These values are even more significant when compared to the fact that just 1% of the existing buildings were built after 2006 (Sigmund, 2016). Therefore, the preservation of the building stock emerges as a relevant element with respect to practices linked to "sustainable development" through the recovery and enhancement of buildings, which means the lack of consumption of materials and energy and the extension of the duration of the architectures themselves, with a view to circular economy (Pollo, 2020).

From the literature, it emerges that, in Italy, the sports infrastructure system is in widespread decay, and generally backward (from a managerial and cultural viewpoint) when compared to more virtuous European or American contexts (Germany and England, above all), where these structures constitute an opportunity for revenue, rather than a "cost centre" (Chierici, 2016). In addition, we would like to emphasize how, despite the specificity of the Italian panorama, where the culture of heritage protection is more rooted than elsewhere and the opportunities for its redevelopment are more

numerous, sports facilities can be classified in two models: the facilities that constitute a cost for their owners, and those that are a source of income (Cammino and Donna, 2019). More specifically, a “cost stadium” is characterized by being public property; the State, in fact, bears maintenance and management costs but obtains low incomes, which essentially derive from the rental of the structures (paid by the sports clubs). This management “model” does not work, except for the days in which important competitions are held. Actually, it is at the basis of the phenomenon which involves, on the one hand, the “disaffection” of the public with respect to these places (as well as their consequent decline); on the other hand, the lack of income for sports clubs, which often in Italy cannot count on the revenues coming from the direct property of the stadiums (Cammino and Donna, 2019).

Although a unique model for defining the economic sustainability of a redevelopment intervention does not exist, considering also the peculiarities of each individual case and the complexity of the disciplines linked to the recovery of built heritage, the intervention of private capital is increasingly desirable, if not necessary. In fact, the economic sustainability of the heritage redevelopment strictly requires to achieve the financial balance between construction and management costs and revenues, also by including collateral activities and functions (Chierici, 2016). To this end, it emerges that currently the most common type of facility management is that of the concession, “which occurs when the public entrusts the management of one or more services to third parties, by defining a contract and reserving the power to direct and control the results achieved” (Faroldi *et al.*, 2012). Concession also relieves the public sector from a series of (organizational, managerial and economic) problems, of which it often cannot take charge. The introduction of new functions within a sports facility, however, also set the challenge of renewing local urban planning tools, which, in many cases, do not allow tertiary and/or commercial activities to be combined with existing infrastructures (Il Sole 24 Ore, 2014).

3 | METHODOLOGY AND OBJECTIVES

In order to evaluate the economic feasibility of a possible financial scenario for the redevelopment of sports facilities, a case study has been taken as an example. It is the “Fausto Coppi” Motovelodrome in Turin, Italy, which has been gaining the attention of the local community since the publication of an “Exploratory Notice” in April 2018 by the Municipality of Turin. The project aims at reaching the financial sustainability in the management of the plant, mainly by transforming it from a rigid to a flexible space, which is able to host, even at the same time, different kinds of sports and/or activities. This automatically opens to the possibility of relevant new earnings, but would not be sufficient in itself. The purpose is to establish a procedure which could be scalable or adaptable to other case studies. Therefore, we evaluated the opportunity to build a new volume for sports use, and to allocate a share of the increased Gross Floor Area (GFA) for commercial use.

The project hypotheses can be considered at a preliminary exploration level; therefore, the estimate of costs and revenues has been treated in a concise way, also thanks to the comparison with similar case studies. Similarly, the management scheme was set as requested in the Exploratory Notice (see Chapter 4.4), allocating an area suitable for commercial use in respect to the limit of 25% of the total GFA. Alternative design scenarios were finally explored, to evaluate how the increase in total GFA can ensure greater market attractiveness for the asset. The hypothesis of allocating a commercial area beyond the 25% limit, for the purposes of greater profitability, was initially only supposed in the design phase, but then effectively validated by the Call for the assignment of the facility (February 2020 – see Chapter 6). Therefore, the specific objectives of the research were: (1) the definition of

the cost of construction and realization; (2) the estimate of the management and maintenance costs; (3) the calculation of a potential catchment area; (4) the construction of a management scheme, in order to define the profitability of the proposed project and to assess if the Exploratory Notice can be considered effective to the end of the recovery of the plant.

4 | CASE STUDY: THE "FAUSTO COPPI" MOTOVELODROME IN TURIN

4.1 Velodromes, an overview of cycling tradition

The first rudimentary velodromes were born in an almost "spontaneous" way; their construction logic involves the creation of two parabolic curves connected to each other by two straight sections, which push the cyclist to maximum speeds and allow an optimal view for the audience. The need to regulate the construction of these facilities, in order to make it possible to compare the performances of athletes in Europe and in the United States, soon led to the definition of more precise construction rules; it was indeed established that the length of the race tracks should be generated as a submultiple of 1 km, therefore, equal to 250 m (four laps corresponding to 1 km), 333.33 m (three laps for 1 km) and, more rarely, 500 m (two laps for 1 km). Today, the UCI (Union Cycliste International) has introduced even stricter standards for the homologation of facilities to be designed for hosting official races, including major events (such as the Track Cycling World Championships); the track length must be equal to 250 m, its floor has to be wooden and the environment must be controlled from a thermo-hygrometric point of view (therefore, it must be indoors). Although some exceptions are granted for facilities built before 2001, these characteristics make many of the existing velodromes unusable for official races.

It was in London, in 1878, that the first Six Days in history was held, on a wooden and indoor track (Bozzuto, 2018). The event included a competition between twelve athletes for six days. Given the resonance of the event, cycling events also spread to the new continent, where, in 1893, the first Track Cycling World Championships took place in Chicago, anticipating the Road Cycling World Championships (which would be held in 1927), the Football World Cup (Uruguay, 1930) and even the first Modern Olympics (Athens, 1896). The birth of some of the main cycling events, still taking place today, dates back to the first decade of the twentieth century; these are the "Tour de France" and the "Giro d'Italia". Alongside the spread and success of road cycling, tracks were increasingly used as a start and finish line for official races, and even for cycling trainings in winter months. In this case too, velodromes were ahead of the times; thanks to them, events like unofficial competitions, football and rugby matches and athletics began to coexist in the same place.

4.2 The decline of the velodromes

Much of the loss of attractiveness of the velodromes, starting from the second post-war period, is due to the advent of television. In fact, broadcasters around the world soon guaranteed almost total coverage of the main sports events, encouraging people to stay home. Furthermore, the progressive specialization of the disciplines and the clearer differentiation between track cyclists and road cyclists from an athletic point of view, together with the economic unsustainability of managing some facilities (too big and not conceived for other sports), soon marked the decline of outdoor velodromes. In particular, at the beginning of the New Millennium, the Italian cycling movement was in great difficulty; in 2000, in fact, no facility complied with the standards set by the UCI for official competitions. Today, only the Montichiari velodrome in Brescia is approved, although, having been classified as Category 2, it is not suitable for hosting big events (Bozzuto, 2018).

4.3 The “Fausto Coppi” Motovelodrome in Turin

The history of the “Fausto Coppi” Motovelodrome dates back to the early twentieth century, when, in the wake of the First World War, SIM — Società Incremento Motovelodromo — expressed its desire to build a velodrome in Turin, which would replace the cycle track in Corso Dante 40, Turin and the velodrome in Corso Re Umberto, Turin. On March 15th, 1920, the project authorization request was submitted for the new motovelodrome, signed by the engineer Ernesto Bourlot, although later on the project was attributed to Vittorio Eugenio Ballatore di Rosana (Polytechnic of Turin – Dipartimento Casa Città, 1985), a well-known exponent of Turin's liberty style, who had already distinguished himself for having designed the grandiose Stadium (1911) (Ferrero and Ribaudò, 1999), as well as famous residential buildings.

Just two years after the opening, the expansion works began; the capacity was increased to about 7,500 seats, in response to the need to accommodate an increasingly large audience. The great success of the early years saw a strong setback towards the end of the 1920s, when the complex threatened to close, but it was saved by a group of Turin sportsmen who took it over. During WWII, the structure suffered severe damage to the stands, the track and the changing rooms. In 1946, with the end of the war, reconstruction and improvement works were started (Magnaghi *et al.*, 1995). In 1948, the “Comitato Regionale dell'Unione Velocipedistica Italiana”, considering the venue of crucial importance for the promotion of cycling, asked for the concession, which would remain valid until 1951. A few years later, new works of modification and development of the complex began; the track, amongst the first concrete works to have been carried out in Turin, continually needs maintenance due to structural problems that could compromise the structure itself.

In the 1960s, a plan to strengthen sporting activities was implemented; as a result, further improvements were deemed necessary: In addition, two tennis courts for public use were built near the facility (Via Boccaccio). However, starting from the '80s, the structure was on the way to decline; in 1993, the absence of a large audience and the need to adapt the facility to current regulations led, to the closure of the Motovelodrome for four years. Finally, with the Ministerial Decree of 22/08/1994, the venue was considered of cultural interest and the property came under the protection of the Superintendence. In the following years, the idea of demolishing the Motovelodrome began to grow, especially after noting, once again, its deterioration and the failure to re-propose it as a sports venue. This hypothesis, however, is repeatedly denied by the Municipality of Turin, recalling how the structure has been subject to the constraint by the Superintendence since 1994.

The Motovelodrome was then gradually transformed into a leisure complex with commercial functions. Since the 2000s, the “competitive” sporting vocation has been increasingly set aside in favour of events of various kinds, which have not always been about the sports identity of the facility. In 2004, the CUS (Sports University Centre of Turin) decided to build its own rugby centre and invested over 200,000 €; in the winter of 2006, during the Turin Winter Olympics, the facility was used to host “Casa Thuringia”, Germany's institutional stand. At the same time, the conviction that its function should have changed radically started to spread; it was even thought that it should be transformed into a large supermarket (Calderaro, 2016). This idea was set aside after numerous protests and petitions. Since 2016, “Pezzi di Motovelodromo”, an association of citizens, has been responsible for maintaining the complex. Since 2017, the velodrome can be visited in occasion of “Open House”, a network of events when buildings can be visited that are usually not accessible for free. On April 5th, 2018 the City of Turin published the “Avviso Esplorativo per l'acquisizione Manifestazione di interesse n. 5/2018” (“Exploratory Notice for the acquisition of Manifestation of

Interest no. 5/2018"). The Heritage, Investments and Contracts Division of the City of Turin confirmed the will of the Municipality to entrust the management of the facility to third parties, with the obligation of preserving its sporting vocation.

Named in honour of Fausto Coppi on September 30th, 1990, on the occasion of the thirtieth anniversary of the athlete's death, the Motovelodrome is located on the east side of Turin, between the river Po and the hills, in Corso Casale 144, on a trapezoidal-shaped area of about 24,360 m². The area is located opposite the Michelotti Park and the Po river (North), Piazza Carrara and via Boccaccio (East), Via Lomellina, a secondary hill road (South), and via Castiglione, a dead-end street (West) (Figure 1).

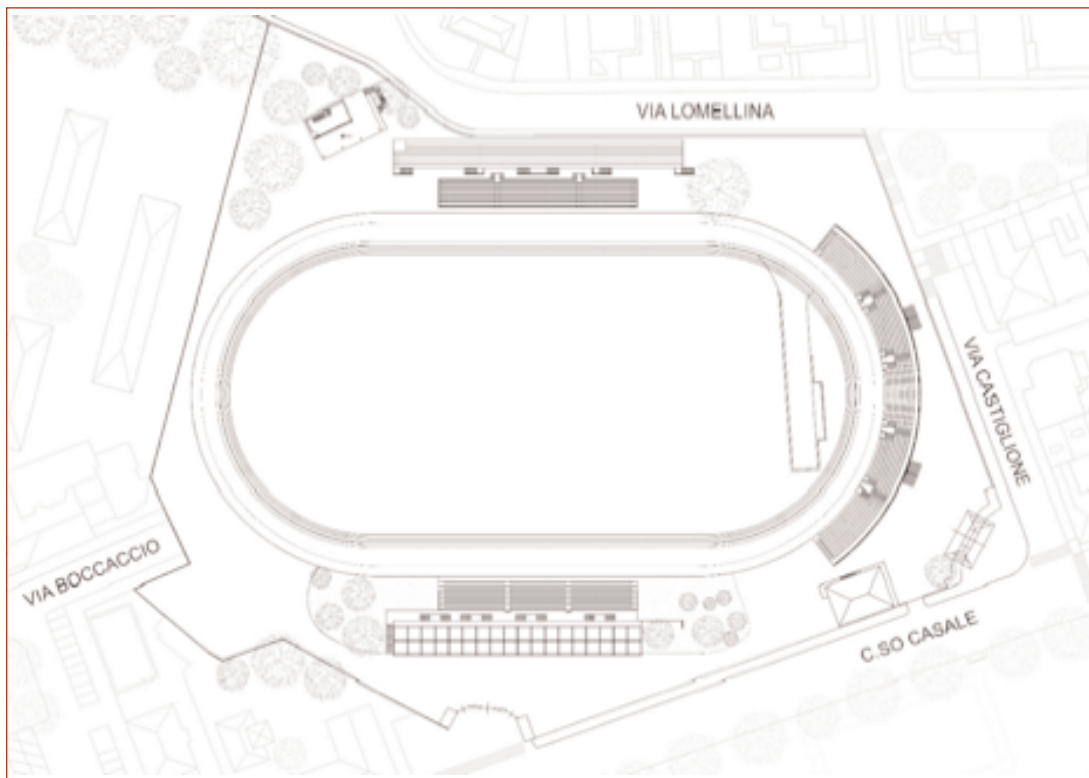


Figure 1 Plan of the area (elaboration of the authors starting from the drawings of "Nuovo Piano Regolatore Generale" by Città di Torino and a preliminary survey). Not to scale

The entrance to the lot is marked by a tripartite portal with round arches, made in the Liberty style, with a wooden roof, located on the corner of via Castiglione and Corso Casale. This, together with the curved stand and the "popular" stand (North) are under the protection of the Superintendence.¹ The entrance is in a defile just off the tunnel which allows the access to the concrete track, which is 393 meters long and 8 wide and inclined at 45° in the curves (Figure 2). Within it, there is an athletics track and a field for football or rugby. The curved steps (Figure 3) are the most capacious and interesting from an architectural point of view; they are accessible via two monumental stairways, still quite intact. On the east side, along a narrow space, created between the boundary wall and the

¹ Città di Torino, Nuovo Piano Regolatore Generale. Azzonamento – Aree normative e destinazioni d'uso. Tavola n. 1, Foglio 98, available at: http://geoportale.comune.torino.it/web/sites/default/files/mediafiles/f09bcor.dgn__3.pdf

track itself, the old press stand can be reached. It offers a privileged view of the field and is surrounded by vegetation. Finally, adjacent to the boundary wall with via Lomellina, there is the “Primi Posti” (south) stand, currently not subject to any constraint. The structures are made with a reinforced concrete skeleton and brick infill; originally, the two linear stands were provided with a wooden roof.



Figure 2 Historic concrete track. Overall view of the plant from the stands (towards North-East), in the background the Basilica of Superga (photo by M. Trane).



Figure 3 View of the stands towards via Lomellina (photo by M. Trane).

The land, in this portion of the territory and within the lot itself, is highly irregular; between the level of the floor near the entrance of the venue and the southern wall there is a difference in height of about 1.5 meter. The difference between the minimum altitude of the southern curved stand and via Lomellina is approximately 15 meters (Figure 4). The presence of the blind border wall currently constitutes a clear break with the city in the pre-hill area.

Outside the lot, this aspect is even more evident. Via Castiglione, which ends with private car garages, is in fact connected with via Lomellina by a modest staircase, created between the boundary wall of the lot and a small public green area, which today constitutes the only opportunity for contact between the two portions of the city (Figure 5).



Figure 4 View of the South Stand from the North Stand. In the background, the retaining wall which shows the difference in elevation between the minimum height of the South Stand and via Lomellina (photo by M. Trane).



Figure 5 Public staircase. Junction between the road level of via Castiglione and via Lomellina (photo by M. Trane)

Inside the lot, substantial fill dirt resolves the differences in elevation between the entrance to the plant and the North Stand. The surrounding wall delimits the plant without any interruption: besides marking the boundaries of the property, its function was to prevent the view inside the lot from via Lomellina. This barrier, more than two meters high, denies any relationship of use with the facility, even a visual one. From a construction and maintenance point of view, the concrete track is one

major problem in the facility. The natural process of degradation of the material itself makes its consolidation urgent. All the stands are currently unusable: the south one has largely collapsed; the north one is in a bad state of conservation; the curved one is better preserved.

4.4 The redevelopment of the "Fausto Coppi" Motovelodrome: the "Exploratory Notice for the acquisition of Manifestations of Interest" no. 5/2018

The publication of the "Exploratory Notice for the acquisition of Manifestations of Interest for the assignment of the Fausto Coppi Motovelodrome in Turin" dates back to April 2018 and marks a turning point in the history of the facility. The purpose of the Notice was to collect any manifestations of interest in the acquisition of the asset, with the formula of the "concession of use" for a maximum duration of twenty years; of the "Redevelopment long lease" for a maximum duration of fifty years; of the "surface property / surface rights" for a maximum duration of ninety-nine years.

The management of the facility, as declared within the Notice, is subject to the conservation of the asset and the preservation of its historical identity. It is possible to destinate a share of the GFA for neighbourhood commercial activities (surface area less than 250 m²), as long as they are strictly connected to sports (according to the Regulatory Plan, within which the Motovelodrome appears as a "v" area, that is "Public Services, areas for public park, for games and for sports"). In fact, the Notice admits commercial activities, services and public establishments within the maximum limit of 25% of the "existing" or "to be planned" GFA. This formula does not exclude the possibility of designing a volume from scratch within the lot, increasing the surface area which can be used for commercial purposes in absolute terms.

4.5 A proposal for the recovery of the Motovelodrome in response to the "Exploratory Notice"

The recovery proposal illustrated below has been developed as part of the research conducted for the Master's Degree Thesis "Proposal for the recovery of the 'Fausto Coppi' Motovelodrome in Turin" in Architecture for the Sustainable Project (Polytechnic of Turin).² The thesis was conceived, following the publication of the Exploratory Notice (April 2018), with the aim of investigating the technical and financial feasibility of a possible design proposal by a hypothetical private investor. The project involved the recovery of existing artifacts as well as the addition of a new sports building.

4.5.1 The project: redevelop the buildings and sew the surrounding urban fabric

The (almost) total demolition of the border wall is central in this design proposal, as the opening towards the park and the river is considered essential for the redevelopment of the area. This choice involves a total redefinition of the access and security systems of the plant. The project aims to give a renewed identity to the Motovelodrome, through a sustainable intervention which can integrate with the prestigious architectural context. The redefinition of the south-west vertex of the lot was crucial, where a narrow public staircase resolves the difference in height between Corso Casale and Via Lomellina. In the project, this node has been configured as the access to the new sports centre and to the new car park, and as an integrated and accessible connecting element (Figure 6).

² The thesis by the authors M. Trane and F. Pozzaglio, with the supervision of Prof. G. Ambrosini and Prof. M. Rebaudengo, was discussed on February 2019 at Politecnico di Torino and was reported as Meritorial Thesis. In November 2019, the thesis obtained second place in the humanistic field of the Award established by the IBRSC (Belluno Institute of Social and Cultural Research). In May 2020, it obtained the "G. Brondino" Award at the Department of Architecture and Design of Politecnico di Torino. In June 2020, it obtained second place in the "Turin: climate and environment" contest, with the patronage of the Piedmont Region and the City of Turin.

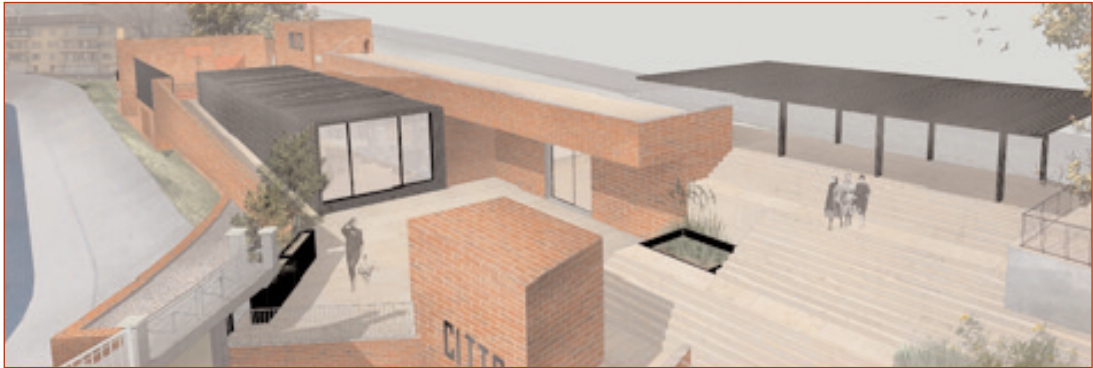


Figure 6 Solution for the urban connection. Redefinition of the public space and arrangement of vertical connections; view on the new sports building (*elaboration by the authors*)

As regards the stands, placed under constraint by the Superintendency, an intervention formally compatible with the existing architecture is planned. The sub-platform areas, historically used as functional spaces for sports, are dedicated to the practice of cycling in the Northern portion, both for the training of athletes and for the finish line of the VenTo track (see chapter 7); in the Southern portion, on the other hand, an entrance hall to the sports centre, changing rooms and technical areas have been designed. A direct connection to the field has also been made through the excavation of an underground tunnel which allows athletes to access both the field and the track without having to go outdoors again. The restoration of all the outdoor stands by waterproofing the mantle is also planned; these could be used for major events, such as the finish line of road cycling races, and their access will be regulated through the ticket office located at the entrance to the Motovelodrome. To ensure greater commercial attractiveness, the portion of the wall on Corso Casale is opened, and a commercial gallery is placed on the ground floor of the North Stand, which is also subject to restrictions and originally intended for service areas. This gallery hosts sports-related businesses, such as a sports goods shop, a bicycle repair workshop, a bike shop and a small food store for athletes. Adjacent to the North elevation, we designed an all-glass volumetric addition. We planned the insertion of a metal roof on the restored and consolidated steps, on which photovoltaic panels are installed. In compliance with what expressed by the Exploratory Notice, we designed no substantial changes in the elevations the stands, while little interventions are conceived to improve the interior spaces.

As for the concrete track, its current dimensions do not meet the UCI standards; that's why the Motovelodrome cannot hold international competitions and events. However, after having assessed numerous hypotheses, it was decided to only carry out maintenance interventions for consolidation and waterproofing and its integral conservation. The current two-lane athletics track is dismantled, and re-proposed within a new six-lane track, separated from the reinforced concrete ring by a continuous glass parapet. It guarantees greater safety for those who practice sports, making it possible to play different sports at the same time. The indoor pitch, historically used for football and rugby, is redone with mixed grass (synthetic-natural), in order to guarantee higher standards and significantly reduced maintenance. The 11-a-side football pitch, smaller than its current size due to the reorganization of the tracks (45 x 70 m), can be divided into three 7-a-side football fields, which can also be used as 5-a-side. The field is also adaptable for the game of rugby; it should be necessary to equip the pitches with special removable nets, to allow the practice of 5-a-side or 7-a-side football matches at the same time.

4.5.2 The new sports centre

To respond to some of the major critical issues in the area and sew the urban fabric, it was decided to add a new sports building, replacing the south stand (Figure 7). The new multipurpose sports centre features three levels. The ground floor, used as a car park with a capacity for 60 vehicles and accessible from via Castiglione, is fully integrated with the area and hidden from view.



Figure 7 View of the new “Mo.To” sports centre from the North seats (*elaboration of the authors*)

Although the Notice suggested to add an underground car park below the pitch, considering the high costs for such an operation and the need to provide special ventilation systems, we decided to create a smaller car park. Actually, we think it would be enough big for the sport centre and much cheaper. The two floors above are intended for sports, together with a small medical centre and a cafeteria. Various activities can be practiced inside the sports centre (there are spaces dedicated to climbing, fitness, functional training, dance and athletics). This could make the whole plant very attractive on the market, as it can potentially be attended by a variety of sports lovers, in an environment that could be considered as unique in the city panorama. The sports centre as a crucial role in morphological terms too, as it acts as a connecting element between two sides of the city, which are now divided by the difference in altitude. This aspect generates a brand-new public space, from which, for economic reasons, the view inside the lot is prohibited thanks to a range of strategies, which are integrated into the architecture (use of vegetation and opaque elements).

5 | EVALUATION OF THE ECONOMIC FEASIBILITY OF THE PROPOSAL

5.1 Cost estimate

The estimate of the construction costs was carried out by quantifying the demolition and construction works (Roscelli, 2014). For each building type or processing category, a parametric cost was identified, derived from a comparison with similar case studies (Bassi, 2014; Collegio Ingegneri e Architetti Milano, 2014) or from specialized price-lists (CONI, 2014). The construction cost is approximately € 2,430 / m², calculated on the new Gross Floor Area (GFA), that is approximately € 230 / m² of Territorial Area (TA), including within this value the work for the arrangement of fields and free areas outside the track, in order to express revenues and costs of the project in a single unit of measurement, thus including all the processes of the demolition and construction phase.

For the estimate of the management costs, we referred to a report on the situation of several sports plants in the city of Turin in 2018 (ANCI Piemonte) about maintenance and management costs. In particular, there are the management costs of Palazzetto le Cupole, Palazzo dello Sport, Stadio Primo Nebiolo, Stadio Monumentale swimming pool, Palazzo del Ghiaccio and Palazzo del Nuoto. The latter

three have not been considered, as they present very different characteristics compared to this case study. We also didn't consider the maintenance costs expressed in the report, as they were calculated on a flat-rate basis. As for the estimate of ordinary maintenance costs, we referred to the data processed by the Sports Department of the City of Turin, concerning 17 facilities "of city interest" and 11 facilities "of local interest managed by the public sector" (Bondonio, 2018). For extraordinary maintenance costs — as usually found in the literature — the 3% of the construction cost was applied every 15 years, in the absence of more specific data. The cost of loan capital was calculated, assuming a debt of approximately 70% of the construction cost (approximately 8 million euros), at a fixed annual interest rate of 2.30%³ over 30 years, which was a period of time admitted by the Notice.

5.2 Definition of the catchment area

It was traced within an area close to the Motovelodrome, considering as acceptable a travel time not exceeding 12 minutes by car. The residents within the resulting area are approximately 32,000; amongst these, the number of the potential users was precautionary assumed by considering a segment of the population aged from 10 to 64, corresponding to 66% of the population (ISTAT). On the basis of statistical data, 34% of the population practices sport occasionally or assiduously, so the potential catchment area corresponds to about 7,330 people.

As for the activities related to cycling, however, the use could be much wider, considering that the first facility equipped with a racing track is 30 minutes away from the Motovelodrome by car (in San Francesco al Campo), and that, moreover, this is the only velodrome in Piedmont (and one of only two in Northern Italy). The statistics also show that 1,661,000 people (IPSOS) practice cycling in Italy. In the absence of more specific data, it is assumed here that only 20% of sportsmen play track cycling (road cycling is a much more played sport) (Bozzuto, 2018). The Motovelodrome could therefore count on a user base of approximately 121,660 people within the province of Turin, although many athletes already use the San Francesco al Campo Velodrome. In light of these considerations, as regards cycling, an average daily ridership was profiled, in relation with the capacity of plant.

5.3 Management hypothesis

As for the scheduling of the sports offer, it is possible to use the football/rugby pitches and the tracks themselves only in the afternoon, compatibly with the opening hours of schools. A specific opening time is planned for all types of commercial and sporting activities (climbing, fitness, functional training, spinning and courses all within the new sports centre; football, rugby, athletics and track cycling, which can be played inside existing buildings). We proposed the setting up of a football school, as well as one for rugby, one for athletics and one for cycling ("Academy"); it is possible to rent the eleven-a-side football, seven-a-side or five-a-side football and rugby pitches at the same time ("exclusive use"). The proposed "timetable", however, is organized so as not to create overlap in the use of spaces on a typical day from March to October (track cyclists usually do not train in the winter months), but also to guarantee that they can host simultaneously even more activities (and maximize the profits).

³ Simulated by <https://www.mutuionline.it/> in January 2019

FOOTBALL		REVENUES					
Modality	Shifts	Days/year	Average ridership/year	Subscription cost/year	Matches/ day	Average cost/ match	Revenues/ year
Academy		153	150	400.00 €			60,000.00 €
Exclusive use (five-a-side / seven-a-side pitch)	Mon-Fri	246			3	60.00 €	44,280.00 €
	Sat-Sun	38			5	50.00 €	9,500.00 €
Exclusive use (football pitch)	Mon-Fri	246			1	110.00 €	27,060.00 €
	Sat-Sun	38	80		2	110.00 €	8,360.00 €
Total							149,000.00 €

Table 1 Profile of revenues derived from the sports offer concerning, by way of example, the case of football. As for the matches/day, it is assumed, based on sector research, that the evening hours are booked for the rental of the pitch on an (almost) continuous basis. It is possible to foresee that, in the absence of reservations for the entire pitch for 11-a-side football matches, this can be converted into three pitches for five-a-side football. The cost of the "Academy" includes a one-time registration fee.

5.4 Results and discussion of alternative scenarios

Once the catchment area was defined, the revenues deriving from each commercial business, the catering activity and each sport were hypothesized. This was made through specific market surveys and analysis of the prices in line with the offer of other similar facilities or gyms in Turin or Northern Italy, based on single entries or monthly, quarterly or annual subscription formula. In some cases, such as for the Rugby Academy, only the annual subscription formula is provided; in others, there is a surcharge for the possible rental of equipment. In any case, there is also a one-off registration fee. As for the sports and according to the management proposed, football is the most profitable sport, while rugby is the least profitable one. The new sports centre, including the bar, could generate an overall annual income far greater than the income deriving from the activities practicable in the Motovelodrome alone. In absolute terms, the greatest revenues come from commercial businesses, essential for the profitability of the project, obviously only if associated with a highly multifunctional and attractive facility (Table 2).

Revenues / Costs	Annual value
Motovelodrome	+ 23.41 €/m ²
Commercial establishments	+ 15.31 €/m ²
Mo.To Sports Centre and Bar	+ 52.62 €/m ²
<i>Total revenues</i>	<i>+ 13.90 €/m²</i>
Maintenance	- 0.84 €/m ²
Management	- 29.12 €/m ²
Asset	- 7.36 €/m ²
<i>Total expenses</i>	<i>- 37.32 €/m²</i>
Balance	+ 15.30 €/m ²

Table 2 Summary table of the project revenues and costs expressed in €/m² of TA

Considering the assumed revenues and the costs for the management, maintenance and loan of the capital, in one year the investment turns out to be profitable for about € 15.30 / m² of TA (Table 2). This considering a ratio between the GFA for commercial businesses (810 m²) and the new overall GFA of the lot (3,313 m²) equal to 0.24 (in compliance with the maximum limit of 25% set by the Notice). Finally, some alternative project scenarios were evaluated (Table 3); from an economic-financial point of view, the aim is to assess whether the addition of a new building to complete the lot is a sustainable choice, or if, on the contrary, it is more profitable to redevelop the existing artifacts only. The alternative scenarios are described below in detail:

- Alternative scenario 1 (AS1) provides only for the redevelopment of existing buildings, together with the redesign of the connection between the road elevations of via Castiglione and via Lomellina and the construction of a car park in place of the current South stands (the possibility of creating underground car parks is excluded in any case, for the reasons expressed in paragraph 4.5.2). The GFA for commercial use was considered as equal to that of the Main Design Scenario (MDS), providing the insertion of a 400 m² all-glass volume adjacent to the North Stands. Considering here that the total GFA was not incremented by adding a new sports centre, this scenario exceeds 20% in the share of GFA for commercial purposes, but this grants the economic feasibility of the scenario (Table 3);
- Alternative scenario 2 (AS2) proposes a further increase (compared to AS1) of the commercial area in the all-glass volume adjacent to the North stands, for the purpose of greater project profitability, even without the addition of the new volume for sports use (Table 3);
- Alternative scenario 3 (AS3) is similar to the MDS from a design point of view, but exceeds in commercial GFA (+50% of the commercial GFA with respect to the MDS) with respect to the limit set by the Notice, in order to grant greater financial attractiveness.

Project scenarios	Existing GFA [m ²]	Total SLP (existing + project) [m ²]	GFA for commercial purpose		Profitability of the project [€/m ² TA]
			[m ²]	[% on total GFA]	
SPP	1,452	3,313	810	24	15.30
SA1		1,852	810	45	3.83
SA2		2,257	1,215	55	15.34
SA3		3,728	1,215	32,5	26.51

Table 3 Comparison between the MDS and the ASs in terms of GFA for commercial purpose and profitability of the project

Table 3 shows that the assumption of adding the new volume for sporting purposes is decisive with respect to the profitability of the Motovelodrome redevelopment project. In fact, on the one hand, it is potentially capable of significantly expanding the catchment area; on the other hand, it is necessary to increase the absolute value of the GFA for commercial use. In any case, we believe that the hypothesis of granting a further increase for the commercial GFA in percentage terms compared to the total GFA could be evaluated, considering the complexity of the project (see AS3). Finally, although the profitability of the MDS and that of AS2 appears similar, in the latter case, an increase in the GFA for commercial use may not be sufficient to ensure greater attractiveness, since, in the absence of the new sports centre, the catchment area of the facility would be significantly reduced.

6 | AFTER THE PUBLICATION OF THE EXPLORATORY NOTICE

The proposal we illustrated was developed as part of the research conducted for the Master's Degree Thesis, after the publication of the Exploratory Notice by the City of Turin and before the publication of the Feasibility Study, which was released by the Municipality after a more accurate survey (see paragraph 6.1). Following the publication of the Exploratory Notice, in fact, four manifestations of interest were received. They are partially illustrated in the "Minutes of the inter-member session for the expression of interest no. 5/2018", drawn up following the public session of 12th July 2018 and available on the "Comune Vende" portal of the City of Turin. The proposals were presented by: (1) A, whose proposal was judged to be excessively burdensome in relation to the elevation of the existing stands; (2) B, whose proposal was judged to be exhaustive in terms of investment plan; (3) C, whose proposal was rejected, as it did not guarantee the conservation of the historic concrete track and planned for an excessive increase in GFA; (4) D, whose proposal was not considered sufficiently detailed. In light of the manifestations received, some points considered significant for the recovery of the facility are highlighted in the minutes: (i) the need to cover the stands, in particular the parallel ones, in compliance with the existing elevation drawings; (ii) the safeguard of the soil permeability; (iii) the construction of underground car parks; (iv) the preference for modular architectural technological solutions, in order to minimize masonry works.

6.1 The publication of the Feasibility Study

More than a year after the publication of the Exploratory Notice, the Feasibility Study for the redevelopment of the property was published (Figure 8) This study highlights hydro-morphological and architectural constraints of the area and carries out a territorial analysis. It considers the Motovelodrome as part of the cycling circuit promoted by VenTo, of which it could be considered as the arrival/departure point. Therefore, the venue could be also potentially considered as part of the EuroVelo 8 cycle path (EV 8), which includes VenTo and runs from Spain (Cadiz) to Cyprus along the Mediterranean coastline. Finally, Study highlights the objectives of the redevelopment project, whose goals should be: (1) conservation, enhancement and re-functionalization of the structure; (2) elimination of architectural barriers; (3) construction of a reference centre for sports, culture, didactics, recreation and health care; (4) improvement of energy efficiency.

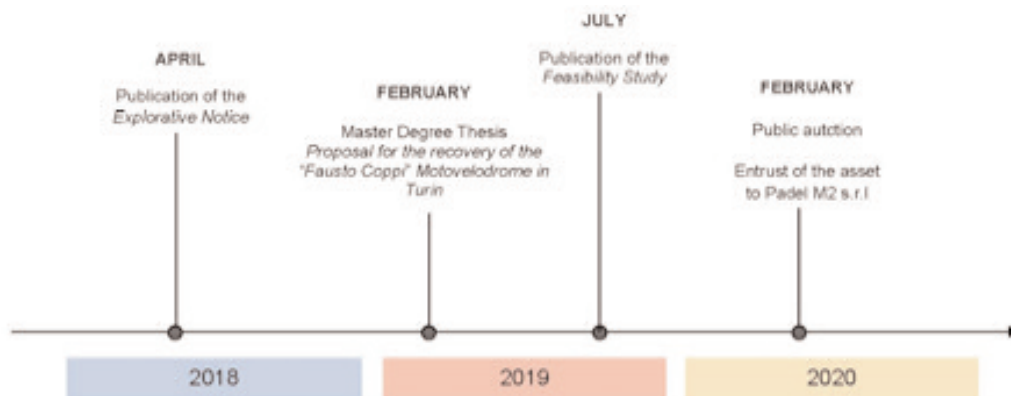


Figure 8 Timeline. Evolution in the process for entrusting the Motovelodrome (elaboration of the authors)

The Feasibility Study also inspires the design. In fact, the construction of a new multi-storey building is allowed: it should be located in correspondence with the former South Stands and its GFA must not exceed 3,100 m². The car parks has now to cover the area bordering via Boccaccio (1,500 m²) and should not be built underground. With the exception of the South Stands, the full recovery of existing structures is envisaged, along with the possibility to create till four 5-a-side football fields. Finally, the Feasibility Study requires the seismic retrofitting of the reinforced concrete structures. The existing GFA is quantified in 1,452 m²; the possibility of allocating up to 25% of the GFA to retail businesses, public establishments and craft service activities is confirmed, but the Study admits the possibility of exceeding this limit "for justified needs [...] after deliberation by the City Council".

6.2 The Announcement, the public auction and the assignment

The proposals received on the occasion of the publication of the Expression of Interest constituted the starting point in support of the overall discipline contained in the Announcement. It was approved with the City Council Deliberation of 29th July 2019, concerning "the Motovelodrome. Concession of the sixty-year surface right to Public Auction with restriction of destination for sporting use. Auction base Euro 250,000.00". Amongst the crucial points there are: (1) the need of carrying out the restoration of the portions subject to protection restrictions (the historic track, the curved and north stands); (2) building recovery is allowed for any functional adjustments, in compliance with the formal, historical and structural characteristics of the asset; (3) the possibility of carrying out interventions aimed at enhancing the value of the asset and at increasing its attractiveness on the market, by adding a new structure in place of the current South Stands and press stand, as emerged from the Feasibility Study and with prior authorization from the Superintendency; (4) the possibility, therefore, to increase the existing GFA with an addition of no more than 3,100 m², for a total of 4,552 m²; (5) the possibility of exceeding the aforementioned limit of 25% up to a maximum of 80% of additional GFA, in the event that the construction of the new building is planned; (6) the obligation to guarantee the use of the facilities for educational purposes, sporting activities and initiatives related to various kind of events at the request of the City.

The call for a Public Auction was authorized for the concession of the surface right and surface property for the duration of sixty years, deemed suitable for attracting potential investors and for guaranteeing the profitability of the intervention. The base of the Auction was set at € 250,000.00 (excluding VAT). On February 4, 2020, in a public session, the asset was assigned using the formula of the secret offers. On the basis of the only offer received, the concession of the surface right/surface property of the facility was entrusted to Padel M2 srl, which submitted an offer of € 351,001.00, subject to a security deposit of € 25,000.00.

7 | CONCLUSIONS AND FUTURE PERSPECTIVES

Compared to the original intentions expressed in the Exploratory Notice, on the base of which the MDS and the ASs were simulated, the Feasibility Study and the Announcement have allowed greater flexibility with respect to the creation of a new GFA and the destination of a part of it to commercial activities (Table 4). As only suggested in the MDS, therefore, the increase in the GFA coming from the addition of a new sports volume turns out to be fundamental for the profitability of the project and the redevelopment of the Motovelodrome. Its state of general decay has been determined by a management fluctuating over the decades, by a lacking of a long-term vision, by the age of the existing buildings and by the impossibility to grant a plurality of sports within a flexible space. Therefore, the answer to the critical and chronic issues that affect the "Fausto Coppi" lies in the project; the hypothesis of recovering only the existing structures is thus not feasible, since it is not sufficient to guarantee a continuous use of the facility by a renewed audience and, therefore, market attractiveness.

Step	Existing GFA [m ²]	Maximum additional GFA permitted [m ²]	Car parks		Commercial use GFA (maximum permitted) [% out of total GFA]
			Surface [m ²]	Position	
Exploratory Notice	1.452	Indefinite	Indefinite	Underground	25
SPP		1.861	1.500	South stand (not visible)	24
Feasibility study		3.100	1.500 (max.)	Side entrance (visible)	25
Announcement		3.100	1.500 (max.)	Side entrance (visible)	25 (+80% of the added GFA)

Table 4 Figures of project steps to entrust the Motovelodrome

Parallel to a project aimed at recovering the artefacts and increasing the existing volume, it is necessary to reintroduce the Motovelodrome within the main sports, cultural and tourist circuits. In fact, it should be remembered that during the last century the facility was the finish line of some of the most important cycling competitions in Northern Italy, such as the historic Milan-Turin and "Giro del Piemonte". In addition, it could constitute the starting/arrival "station" of the VenTo track, a project that began in 2010 but has not yet been completed. Therefore, any possible redevelopment design and economic proposal of the "Fausto Coppi", should also take these aspects into account. Indeed, it should be considered that the issues linked to sustainable urban mobility are today of primary importance with respect to local development and sustainable policies.

Although the standards provided by the UCI do not allow for official competitions to be held within facilities that do not comply with them, it is still possible to assign a secondary function to the historic facilities. This is the function of "gym" for the training of cyclists, as we know that many of the most famous cyclists of the last century (including road cyclists) started their training on the tracks of velodromes (Bozzuto, 2018). With a view to redeveloping these facilities, as well as encouraging the cycling movement — which has always been the bearer of psychophysical health for citizens through the promotion of sports practice —, the recovery of disused sports infrastructures would therefore

provide a privileged meeting place where future athletes can be trained, also considering the fact that they do not have adequate space and equipment in Italy.

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Notes

The paper is the result of a shared work by the authors who are equally responsible for it. For the purpose of identifying the contributions, Trane wrote paragraphs 1, 2, 3, 5, 6, Pozzaglio 4, paragraph 7 is double signed by Trane and Pozzaglio.

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