



ZOFNASS PROGRAM
FOR SUSTAINABLE INFRASTRUCTURE

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URBAN IMPROVEMENT AND MAINTENANCE OF THE INTERIOR CIRCUIT – MEXICO



Figure 01:
Sources: Provided by project team, Atris Finance and Grupo Indi.

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1. PROJECT DESCRIPTION & LOCATION

The Interior Circuit is one of Mexico City's major highways; the 42 km were designed as an interior ring to contain the first urban quadrant of the city. It was constructed in 1961 and finalized in 1976¹ during the administration of Ernesto P. Uruchurtu. The road traverses through 8 districts and some of the most important avenues such as Insurgentes, Paseo de la Reforma, Río San Joaquín, Tlalpan, Oceanía, Zaragoza and Viaducto. Due to the rapid urban expansion of the last decades, the highway now faces severe traffic problems. According to Mexico's City Environmental Ministry (Secretaría del Medio Ambiente, SEDEMA) traffic load doubled from 1996 to 2006 and during the last year it reached 3.75 million vehicles². The average speed is well below the road's initial design speed of 80km/hr. According to traffic studies, it takes an average of 32.8 minutes at a speed of 31.8 km/h to travel between Mixcoac and Tezontle Avenues³

Moreover, the total traffic load in the area of study of the Interior Circuit has been estimated at 69,422 vehicles daily, divided between private cars (99.3%), buses (0.30%) and cargo (0.40%)⁴. Three major problems have been identified as part of the low-speed traffic flow and time wasted at the Interior Circuit: intersections with unnecessary traffic lights, intersections with English turns (left turns), and the coalescence of multiple streets (traffic inputs and outputs). All of these categories were evaluated at multiple intersections, providing different solutions for each area.

As the project is located at the heart of an urbanized area, it also incorporates the improvement and creation of green areas, streetlights, pedestrian bridges, vertical and horizontal signaling, playgrounds, sidewalks, drainage, garbage collection, paving, monitoring stations and traffic lights. Within these interventions the specific aim of this project is to ameliorate traffic flow, while enhancing connectivity and mobility within the city. The benefits are reflected in eliminating conflicts on determined intersections. The benefits are separated into Vehicle Operating Costs (VOC) and timesaving, saving a total of 224.8 million pesos⁵ (\$15.3 million USD) in its second year. Taking into consideration the project indicators, the benefits outweigh the costs by optimizing traffic levels. It is estimated that the project will save a total

¹ Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales, Dirección de Construcción de Proyectos Especiales "A". *Evaluación Socioeconómica, Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México*. (Ciudad de México, 2013). p 7.

² Ibis.

³ Ibis, p 3.

⁴ Ibis, p 9.

⁵ Ibis. p 68.

time of 0.19 hr. (11.14 min) per person daily⁶ indicating an annual savings of 20,892 daily hours or an annual savings of 184.7 million pesos (\$12.5 million USD).

The project is divided into two phases. The first will be based on the construction of certain structures, such as three bridges at the intersections of the Interior Circuit with Plutarco Elias Calles Road, Tezontle Avenue and Revolution Avenue. It also includes a traffic amendment at Interior Circuit and Oriente 106 Avenue and one tunnel at Interior Circuit and Insurgentes Avenue. This phase began on 1 January 2014. The second phase of construction is expected to begin late 2014 or early 2015. This project is being developed following a Public Private-Partnership (PPP) with the participation of Indi Group, INDISA and Hermes Infrastructure Group. The total cost of the project is 7.5 billion pesos (\$571.5 million USD).

2. APPLICATION OF THE ENVISION RATING SYSTEM

The Envision™ system is a set of guidelines that aid in optimizing the sustainability of an infrastructure project during the planning and preliminary design phases, as well as a means to quantify the relative sustainability of the project. In this case study, the infrastructure to be assessed is the Urban Improvement and Integral Management of Mexico City's Interior Circuit.

Envision consists of 60 credits grouped into five categories: Quality of Life, Leadership, Resource Allocation, Natural World, and Climate and Risk. Each credit pertains to a specific indicator of sustainability such as reducing energy use, preserving natural habitat, or reducing greenhouse gas emissions. Those credits are rated on a five-point scale referred to as a 'level of achievement': 'improved', 'enhanced', 'superior', 'conserving', and 'restorative'. Evaluation criteria are provided to determine if the qualifications for each level of achievement have been met for a particular credit. In each of the five categories there is a specific credit called "Innovate or exceed credit requirements". This is an opportunity to reward exceptional performance that applies innovative methods within the subjects that Envision evaluates.

The criteria for the levels of achievement vary from credit to credit, but generally an 'improved' level of achievement is awarded for performance that slightly exceeds regulatory requirements. 'Enhanced' and 'superior' levels indicate additional gradual improvement, while 'conserving' often indicates performance that achieves a net-zero or neutral impact. 'Restorative' is the highest level and is typically reserved for projects that produce an overall net positive impact. The Envision system weighs the relative value of each credit and level of achievement by assigning points. Credit criteria are documented in the Envision Guidance Manual, which is

⁶ Ibis. p 67.

available to the public on the ISI⁷ and Zofnass Program⁸ websites.

3. QUALITY OF LIFE CATEGORY

Envision's first category, Quality of Life, pertains to potential project impacts on surrounding communities and their respective wellbeing. More specifically, it distinguishes infrastructure projects that are in line with community goals, clearly established as parts of existing community networks, as well as consider the long-term community benefits and aspirations. Quality of Life incorporates guidance related to community capacity building and promotes infrastructure users and local members as important stakeholders in the decision making process. The category is further divided into three sub-categories: Purpose, Wellbeing, and Community.

Purpose

The Purpose subcategory looks into community growth and development, as well as job creation and the general improvement of quality of life. Some of the desired positive outcomes of an infrastructure project are knowledge creation and worker training.

As the Interior Circuit is located inside México's City urban areas, all the communities around the different interventions will be greatly benefited by increased mobility and connectivity. The selected intersections improved the socio-economic conditions of the community by facilitating access, flow and circulation around such areas. Elements of pedestrian accessibility such as walkways and bridges have been considered along the highway's route. The project has also considered including a lighting proposal, which will simultaneously enhance security and the character of the selected areas. The project has outlined certain strategic actions in order to involve the community; however, the main focus of this project has been traffic reduction. Although the project has created enormous benefits for the surrounding communities with such additions as public spaces, it has consigned most of its attention to private mobility.

On the other hand, the project team has established a program for enhancing the skills of local workers during the development and construction phase of the project. The project will strategically contribute to promote and increase employment opportunities by providing an educational program with an alliance to an NGO called "Constructing and Growing" (Construyendo y Aprendiendo)⁹. The program is intended to provide skills at different levels of

⁷ www.sustainableinfrastructure.org

⁸ www.zofnass.org

⁹ Operadora y Mantenedora del Circuito Interior. Construyendo y Creciendo, *Convenio de Colaboración en Materia Intervención Educativa*. (México, Distrito Federal, 2014)

education. The program levels range from alphabetization to high school and it attempt to elevate the quality of construction while providing an educational emphasis. The team in collaboration with the NGO has made an effort to assess workers through the corresponding academic year. To spread awareness, communication campaigns were conducted inside the construction site. Other resources such as classrooms, academic materials and computers were also provided. The initiative helps workers to conclude their studies, while expanding their knowledge, skills and capacity.

More involvement with neighboring communities as part of the design or decision-making process has been identified as an opportunity for improvement.

Community

The Community subcategory addresses the health and mobility of local communities, as well as noise and vibration in the area. The project is focused on improving circulation along the Interior Circuit highway by assessing the immediate needs of its users.

Specific improvements and strategic interventions at intersections will substantially increase the average speed from 35km/h to 65 km/h¹⁰, which will improve community mobility and access in the area. This will signify considerable advantages for the community and users of this important highway. Similarly, the project team has identified the community needs by prioritizing three main problems: a) intersections with traffic lights b) intersections with English turn (left turn) and c) coalescence of multiple streets.

The project team has also engaged adjacent communities in order to communicate, inform and prevent possible disruptions due to construction. The project considers two phases of construction which have incorporated a traffic reduction program and a communication campaign to inform the community about the work. During the construction phase, in order to promote safety and wayfinding, the project team has incorporated horizontal and vertical signaling for facilitating mobility, safety and access. It has designed a specific detour program¹¹ for the times during which the construction work takes place. Moreover, the project team has provided safety measures to its workers, including the delineation of strategic construction work zones and supervision of safety materials and norms.

Given that the project is focused on access and mobility, an area for improvement would be to promote alternative non-motorized modes of transportation in the area. This will require an additional analysis of how bicycle and pedestrian walkways can be integrated into the existing

¹⁰ Ibis. p 67.

¹¹ See project detail plans on diversion of works. "13-RVPM2-SDO-3800-III-002-P-00 DESVIO DE OBRA.dwg"

transit infrastructure.

Wellbeing

The Wellbeing subcategory looks into visual and functional impacts of infrastructure projects in the area where they are located. Projects are encouraged to integrate their new features into the local communities, minimizing the impact on the natural character of the area. Historically the Interior Circuit has been of major importance for the overall circulation and connectivity of the city; nevertheless the highway has lost its connectivity potential due to increased traffic flow and decreased speeds. The project's primary goal is to reinstate local connectivity, mobility and access.

The project is preserving local views by limiting its major improvements to Mexico City's urban components, such as sidewalks, green spaces and recreational areas. In order to promote the enhancement of public spaces the project has created green and public spaces that will be of great impact to the various neighborhoods. Along these interventions and by the provision of urban equipment and public amenities it is expected to recover the urban image of the area while promoting urban and economic development.

As a measure to protect and integrate the elements of great importance in terms historical preservation, public views, identification of protected areas, local character, and urban context, it will be recommended to develop plans that identify these elements. This will guarantee a better integration with the project being developed.

4. LEADERSHIP CATEGORY

Leadership evaluates project team initiatives that establish communication and collaboration strategies early on, with the ultimate objective of achieving sustainable performance. Envision rewards stakeholder engagement as well as encompassing a holistic, long-term view of the project's life-cycle. Leadership is distributed into three sub-categories: Collaboration, Management, and Planning.

Collaboration

The Collaboration subcategory accounts for the importance of integrating a wide variety of stakeholders to promote a more collaborative approach, creating opportunities for innovation and a better project. The project's major objective is to reduce traffic congestion at the Interior Circuit. In order to achieve this major goal, various agreements were generated between four different stakeholders - Gami Ingeniería e Instalaciones, La Peninsular Compañía Constructora,

Operadora y Administración Técnica, and Impulsora de Desarrollo Integral¹². The project team has made a good effort to communicate and collaborate with its stakeholders. Although the project's aim of reducing traffic flow and increasing mobility has been established as a primary goal, an integral sustainable framework for environmental, social and economic impacts has not been defined. Stronger evidence of management structures and organizational aspects showing the project's responsibility to promote and integrate sustainable practices will create a more sustainable output.

In this context, only certain intersections have been studied in depth, through a series of traffic analyses, to identify the major community needs. The project team developed a quality insurance plan for guiding the project's performance. It has assigned a quality manager in order to monitor and facilitate adequate practices within the activities related to the project. This plan is important due to the various stakeholders that participate in this project. However, the participation and involvement in decision making seems limited to the constraints of the urban environment and the information collected on the traffic studies. The project team strived to create green areas, public and recreational spaces and pedestrian bridges for improving the neighboring communities of the specific interventions. Social communication campaigns and meetings were held in order to inform and integrate the community into the different phases of development.

Management

The Management subcategory promotes a more synergistic approach to operations and management; this can apply within the project scale or to larger infrastructure systems. This will lead to new ways of managing the project while increasing sustainability and useful life.

The 42 km of the Interior Circuit were designed as an interior ring for containing the first urban boundary of Mexico City. Its construction was finalized in 1976. Since then, metropolitan population growth has exceeded the highway's capacity. This project is a perfect example of integration between the existing road and the new infrastructure being built. Through a thorough analysis, major issues have been recognized and an integrated plan has been developed in order to account for the operational realities of the existing elements. This will greatly improve the area and bestow more efficient infrastructure, since the acquired knowledge of the previous project will be integrated into the new one. The project has created synergies within the various neighboring communities, through the creation of public space and

¹² Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales. *Convenio Modificatorio al Contrato Administrativo para la Prestación de Servicio a Largo Plazo para el Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México.* (Ciudad de México, 2013).

green areas, the improvement of pedestrian and automobile connectivity, and generally the improvement of the city's image. Within the aforementioned interventions, the intersection with Insurgentes Avenue stands as one of the most important due to its identity as an economic corridor.

The project team designated a specific plan within its Quality Insurance Plan¹³ for monitoring, facilitating and guiding project management. The plan has been divided into different elements, which include planning and design processes, communication among the stakeholders and community, work environment, project construction, and project performance monitoring. An important factor is that the project team has also considered a 32-year Plan for Long-term Monitoring and Maintenance of the Interior Circuit. The first two years will be devoted to construction, and then the existing infrastructure will be assessed and improved over the next 30 years. The maintenance plan includes pavement, signaling, cleaning, lighting, green areas, and pedestrian bridges, among others.

The development of a study that identifies potential nearby by-product facilities and waste streams that could be integrated into the project, as well as the identification of opportunities to use recycled materials during all phases will improve project performance.

Planning

The Planning subcategory takes into account the long-term view of the project and to what degree the integration of sustainable practices has been taken into consideration. This subcategory encourages the understanding of regulations in both the long and short-term.

Each intersection has developed and established certain specific practices for accomplishing quality and sustainable standards. Such efforts include the distribution of resources, management and operations within construction works and other regulations for improving project standards. The team has strived to engage with different stakeholders such as the Ministry of Public Works, the Ministry of Environment and the Public Space Authority. Within the various agreements the project team has considered a budget for long-term monitoring and maintenance of 120 million pesos¹⁴ (\$886,103 USD) per year. These expenditures will help to optimize the conditions of the project during the operational years.

The project is embedded within multiple agencies and stakeholders; however, its approach has

¹³ OMCI, "Plan de Aseguramiento de Calidad. Proyecto: Mejoramiento Urbano y Mantenimiento Integral del Circuito Interior de la Ciudad de México, que incluye la implementación de soluciones y adecuaciones viales" (Ciudad de México, 2014).

¹⁴ Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales, Dirección de Construcción de Proyectos Especiales "A". *Evaluación Socioeconómica, Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México*. (Ciudad de México, 2013). p 62.

not addressed the importance of a systematic and comprehensive approach for optimizing infrastructure performance. The project team developed a quality insurance plan that will guide performance, nevertheless the collaboration necessary to approach multidisciplinary processes to improve sustainable performance has not always been fulfilled.

5. RESOURCE ALLOCATION CATEGORY

Resource allocation deals with material, energy, and water requirements during the construction and operation phases of infrastructure projects. The quantity and source of these elements, as well as their impact on overall sustainability, is investigated throughout this section of the Envision rating system. Envision guides teams to choose less toxic materials and promotes renewable energy resources. Resource Allocation is divided into three subcategories: Materials, Energy, and Water.

Materials

The Materials subcategory seeks the minimization of the total amount of material used during the lifespan of the project. The minimization of material usage reduces the natural resources to be extracted and processed, as well as the energy involved during the whole process including production and transportation.

The project team has selected concrete as its basic material for all tunnels and bridges. Organic material has been selected for green areas. Moreover, under Mexico City regulations it is specified that 25%¹⁵ of all materials should be recycled. In this view, it is likely that recycled materials-- such as clay, gravel or sand-- have been introduced, however this information has not been integrated into the project's documentation. Although the team has developed the project under such guidelines, a general analysis specifying percentages and sources has not been found.

One of the most relevant practices regarding material allocation is the distribution of organic materials, produced during excavation, into the planned green spaces and other green areas in proximity. The project team has identified and maximized opportunities for minimizing waste. It has reported that 10% of the excavation by-products will be reused, while 90% will be recycled at industrial waste treatment facilities. The improvement of the Interior Circuit includes various sustainable practices that have been certified by Mexico's City Ministry of Environment under the establishment of general procedures and parameters. The proposal integrates various opportunities and proposals for waste reduction and material allocation, but the project team

¹⁵ Secretaría del Medio Ambiente, Dirección General de Regulación Ambiental. *Resolución Administrativa Plutarco E. Calles.*(Ciudad de México, 2013) p 17.

has not developed a complete assessment regarding material reuse or exchange. This has been identified as an opportunity for project improvement.

Energy

The Energy subcategory addresses the importance of reducing overall energy use during the lifespan of the project, specially the energy produced from non-renewable sources.

In terms of energy reduction the project team has stood taken advantage of Mexico's City solar energy potential. The project will use photovoltaic cells along the Interior Circuit, embracing a considerable amount of renewable energy use. The project team has also contemplated the use of a maintenance and energy monitoring system that will be incorporated through the project's operation. The project has specified this practice in the energy clause stated in the Administrative Resolution of each intervention. This practice constitutes one of the major actions for reducing energy consumption. Although the practices regarding energy reduction have been pursued intensively, there is an opportunity for improvement with a more comprehensive documentation of energy saving, as well as the monitoring of the renewable energy requirements. The project also uses energy-saving lighting LEDs when required. The project team has developed lighting designs in order to incorporate these guidelines into the public space design and improve the neighborhood's pedestrian walkability and security. Moreover, the project itself does not represent a major increase in energy consumption, as its major role is based on mobility and traffic flow.

Water

The Water subcategory seeks to promote the reduction of overall water usage, especially potable water. Monitoring and studying water availability as well as looking for alternative water resources are strong points to emphasize to reach higher levels of sustainability.

One of the major challenges for any project in Mexico City is water-related issues due to the environmental fragility of the city. The project team has excelled on potable water reduction: 100% of the water used is recycled. The use of potable water in this project has been completely avoided, replaced with by residual water or rainwater harvesting. Recycled or harvested water will be used for irrigation of vegetated surfaces, depending on the season of the year. This has been stated under the Landscape Project Specifications¹⁶ and the actions have been supported by the Ministry of Environment under the water clause¹⁷.

¹⁶ Espacios Verdes Integrales SA de CV, "*Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Areas Verdes para el Proyecto Distribuidor Vial Tlalpan*" (Ciudad de México, 2014).

¹⁷ Ibis, p 20 and 25.

Mexico City has-- among others-- four groundwater bodies located at Mixcoac, Churubusco, Consulado and La Piedad. In this context, the watershed in which the project is located constitutes a major source of freshwater for Benito Juárez Municipality. The project intervention located at Rio Churubusco forms part of the basic drainage and sewage infrastructure connected to the General Drainage System of the Valley of Mexico. Nonetheless, the project does not directly interfere with this system and it does not affect water availability. The city has focused major efforts on reducing environmental disturbances. According to Mexico City regulations, it is prohibited to spill any type of water without an appropriate separation of solid waste; additionally, the team will be obliged to replace and renew the water resources if they are agitated.¹⁸

To improve the sustainable performance of the project in this category, it is recommended to develop a water availability assessment in order to identify the location, type, quantity, rate of recharge and quality of water resources. This will ensure and promote more efficient operations, helping both overall costs and the environment.

6. NATURAL WORLD CATEGORY

Natural World focuses on how infrastructure projects may impact natural systems and promotes opportunities for positive synergistic effects. Envision encourages strategies for conservation and distinguishes projects with a focus on enhancing surrounding natural systems. Natural World is further divided into three sub-categories: Siting, Land and Water, and Biodiversity.

Siting

The Siting subcategory takes into consideration the fact that infrastructure should be sited to avoid direct and indirect impacts on important ecological areas. The Interior Circuit improvement project is located at the heart of an urbanized area. Having been designed and constructed as a ring that would contain the first quadrant of the city, the Interior Circuit constitutes one of the major highways within Mexico City. Due to population and urbanization growth, the ring connects and traverses eight different districts as well as other important corridors such as Insurgentes Avenue, Paseo de la Reforma, Río San Joaquín, Tlalpan, Oceanía, Zaragoza and Viaducto. It is located in a watershed that constitutes a major source of freshwater for Benito Juárez Municipality. Specifically, the construction works located at Rio Churubusco are above an underground river that is now connected to the General Drainage

¹⁸ Secretaría del Medio Ambiente, Dirección General de Regulación Ambiental. *Resolución Administrativa Plutarco E. Calles, Molinos, Tezontle and Tlalpan.*(Ciudad de México, 2013) p 14.

System of the Valley of Mexico. The intervention does not affect any pristine aquatic environment, since the hydraulic infrastructure is located at deep underground levels.

The selected sites will incorporate a series of bridges and tunnels in order to facilitate traffic flow. Along the major infrastructure improvements, the project also integrates certain green and public spaces. In the existing the green area the project estimates that 870 species will be removed, while 2,433 will be replanted and 71 will be transplanted¹⁹. In terms of soil composition, the selected sites for intervention contain mostly clay and the areas are classified into lacustrine and transition soils. These types do not represent any hazard or any major challenge regarding its geographic features.

Land & water

The Land and Water subcategory looks to the minimization of impacts on existing hydrologic and nutrient cycles, paying particular care to avoid the introduction of contaminants through stormwater runoff or chemicals such as pesticides and fertilizers.

During its long history, the Mexico City Metropolitan Area has been dramatically transformed. The city is now located on an ex-lacustrine area. Many rivers and water bodies used to traverse the city but only one of its water sources still comes from groundwater extraction. The interventions located along the Interior Circuit do not interfere with the city's water infrastructure system as it is located several meters underground. It is important to consider that the overall hydraulic connection of Mexico City has been greatly transformed in the past and that the project is not affecting the present conditions. Although the intersection located at Rio Churubusco represents one of the major connection points to the General Drainage System of the Valley of Mexico, the project does not interfere with this system.

Moreover, the project does not affect any permeable surface or natural site as the site of intervention is an already developed urban area that has already been paved. In this regard, no floodplain or surface water function has been altered, nor has the Interior Circuit infrastructure been subject to frequent or severe flood damage. Alongside the interventions that will take place, green areas have been integrated into the project. The project's team strived to develop a landscape proposal that specifies that green spaces will serve multiple public purposes while capturing stormwater. All green spaces include different vegetation types which are supported by landscape functions for groundwater management. Green spaces will be irrigated with recycled water or with stormwater harvesting. The areas have been designed with consideration for Mexico City's precipitation variability, receiving an average of 240 mm of

¹⁹ Secretaría del Medio Ambiente, Dirección General de Regulación Ambiental. *Resolución Administrativa Plutarco E. Calles, Molinos, Tezontle and Tlalpan.* (Ciudad de México, 2013) p 4.

annual precipitation and having its extreme rain season occur during the summer²⁰. These factors are of great importance due to all the interrelated water issues that the city is facing.

The use of the stormwater has so far only been specified for irrigation purposes. It is recommended to expand the scope of the project in relationship to stormwater harvesting, since there is potential for developing a broader infrastructure project that supports the landscape proposal. More comprehensive studies regarding the development of water storage possibilities as well as cistern storage capacities could be integrated into the project and improve its sustainable performance.

Biodiversity

The Biodiversity subcategory looks into how infrastructure projects minimize negative impacts on natural species and their habitats, both on and near the site.

As stated before, the project is located in an urban area that does not include any conservation or natural zones. There is no evidence of existing prime habitats and species. Being an urban project, the integration of species has been developed through the landscape proposal, which presents a catalogue in which the plant species have been studied and carefully selected for being adapted to the climatic conditions of Mexico City. For its design criteria elements like orientation, solar exposure, shadow and wind have been taken into consideration. The project team stands out in certifying that the selected trees are plague and illness free, and they also plan to avoid the use of species whose physical characteristics can affect the survival of other plants. These characteristics are speed of growth, tree height, foliage and root development, which can affect other plants or even pedestrian users due to its proximity to street and sidewalks. These actions will help not only to recreate a more vivid urban environment, but also to support other landscape features such as runoff reduction or provide shadow. The project team has developed different analysis for identifying Mexico's City environmental conditions, however the project's main emphasis has been located on facilitating traffic flow and increasing connectivity. As a result, any environmental related topic has been analyzed on a secondary stage which remains underdeveloped. Although there are a lot of opportunities related to the potential impacts, there is a lack of investigation into these topics.

To improve the project performance it would be recommended to include in the landscape project a list of invasive species in the region and a map of all invasive species found on or within $\frac{3}{8}$ mile (1000 m) of the site. The project could also provide further detail specifying that the species introduced are non-invasive and that there is a landscaping strategy that includes all

²⁰ Espacios Verdes Integrales SA de CV, "Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Areas Verdes para el Proyecto Distribuidor Vial Tlalpan, Puente Vial Plutarco Elias Calles and Puente Vehicular Tezontle" (Ciudad de México, 2014).

vegetation species.

7. CLIMATE & RISK CATEGORY

Envision aims to promote infrastructure development that are sensitive to long-term climate disturbances. Climate and Risk focuses on avoiding direct and indirect contributions to greenhouse gas emissions, as well as promotes mitigation and adaptation actions to ensure short and long term resilience to hazards. Climate and Risk is further divided into two sub-categories: Emissions and Resilience.

Emission

The Emissions subcategory aims to assess the reduction of dangerous emissions, both greenhouse gas emissions as well as other pollutants, during all stages of a project's life cycle.

Air quality is one of the most pressing contemporary challenges in Mexico City. Some of the emissions come from urban-related activities, such as industry, trade, services, hospitals and transportation. The Interior Circuit sees a high volume traffic, with an average of 69,000 vehicles²¹ circulating on a daily basis. This represents a vast impact on gasoline and diesel air pollution. Traffic analyses show that the project would be of great influence to improve air quality in Mexico City, since vehicle pollution reduction is one of the biggest challenges for a city with 22 million inhabitants. Despite this being this a major asset of the project, they did not conduct any specific calculation or low carbon assessment regarding the reduction of vehicle air pollutant emissions. A more detailed analysis should be done by the team regarding emission reduction measures in order to understand the real impacts of the intervention.

Resilience

The Resilience subcategory looks into the ability to withstand short-term risks, such as flooding or fires, and the adaptation to long-term conditions, such as changes in weather patterns, sea level rise, or changes in climate. A more sustainable project seeks to Increase adaptability and decreased vulnerability looking to meet the future needs of the users.

Mexico City faces various risks, some of them geological like earthquakes and others climatic such as temporal floods or heat island effect. In this matter, the project has incorporated green areas and spaces that will help to mitigate and reduce heat island effect. The intervention that has done this most extensively is the one located at Insurgentes Avenue, where a linear park

²¹ Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales, Dirección de Construcción de Proyectos Especiales "A". *Evaluación Socioeconómica, Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México*. (Ciudad de México, 2013). p 3.

and a fountain have been located above the tunnel. It is expected that the integration of green areas and vegetation will support the infrastructural interventions in order to mitigate some of the climate-related issues. These green spaces will also include specific types of vegetation that are appropriate to Mexico City's climate. Although green areas play a key role into the project proposal, there is still not a clear performance metric for such areas. There exists a strong emphasis on facilitating mobility and connectivity inside the Interior Circuit through bridges and tunnels, while other resilience strategies and analysis have not been developed at this point.

The project is located in a highly populated area, which may be influenced and affected over time due to climate change. Therefore it is recommended that the project consider a long-term evaluation in order to assess and consider strategies of adaptation for the Interior Circuit infrastructure. Information that should be provided includes ambient temperature conditions and increased frequency of storms, flooding or other events. This will help in the creation of a plan that considers these threats as part of the design life of the project. The plan should also incorporate notions about recovery from extreme events and document input from local and regional emergency management officials.

8. SUMMARY AND CONCLUSION

Road infrastructure constitutes the backbone for development and economic growth in a region. Mexico City is connected through various corridors and highways, which allow the development of different economic activities and various services. After recognizing this matter the government has paid major attention to mobility issues, developing a series of new highways and other public transportation services. Other public works have been focused on the assessment and rehabilitation of existing infrastructure, enlarging its life span and facilitating mobility inside the metropolitan area. The improvement and maintenance of the Interior Circuit comprehends a series of interventions throughout 16.5 km of one of Mexico's most important highways. Its construction began in 1961 and it was completed in 1976 under Ernesto P. Uruchurtu. The road was designed to contain the first quadrant of the city, however due to rapid urbanization and population growth the highway is now strategically located at the center of the metropolitan region. It connects various districts and other major corridors on which the mobility of the city relies, such as Insurgentes, Paseo de la Reforma, Río San Joaquín, Tlalpan, Oceanía, Zaragoza and Viaducto. The highway is also connected to some of the major points of public transportation such as the BRT system and other subway stations throughout its route.

According to the Mexico City Environmental Ministry (Secretaría del Medio Ambiente, SEDEMA)

traffic rates doubled from 1996 to 2006 and during the last year it reached 3.75 million. The city and the highway now face severe challenges due to increased traffic congestion and lack of infrastructure. The project team realized a thorough investigation for determining the most conflictive crossings and other possible problems related to traffic flow and connectivity. The different areas of study that were analyzed demonstrate that the average speed is 31.8 km/h with an average time of 32.8 minutes between Mixcoac and Tezontle avenue. The study also revealed that this is far below the initial road design speed of 80 km/hr. The total traffic load on the area has been estimated at 69,422 vehicles daily, of which 99.3% correspond to private cars, 0.30% to buses and 0.40% to cargo.

Traffic studies revealed that the three main problems related to low-speed traffic flow at the highway are: 1) Intersections with traffic lights 2) Intersections with English turn (left turn) 3) Coalescence of multiple streets (traffic inputs and outputs). In light of the Quality of Life category, the proposal focused on improving and facilitating vehicle connectivity through the construction of three bridges at the intersection with Plutarco Elias Calles Road Tezontle Avenue and Revolution Avenue. It also includes a traffic amendment at Interior Circuit and Oriente 106 Avenue and a tunnel at Interior Circuit and Insurgentes Avenue. The latter has a major impact on the neighboring communities, as it integrates a linear park and a roundabout that connects with the BRT Line 1 located at Insurgentes Avenue. The project also includes the improvement of green areas, streetlights, pedestrian bridges, vertical and horizontal signaling, playgrounds, sidewalks, drainage, garbage collection, paving, monitoring stations and traffic lights.

The project's stakeholders made a large effort to enhance connectivity and mobility within the Interior Circuit. The benefits of these interventions will be reflected in social and economic welfare. It is expected that these operations will almost double the circulation speed from 35 km/hr to 65 km/hr, having a timesaving benefit equivalent to 224.8 million pesos (\$15.3 million USD) in its second year. It has been estimated a total time of 0.19 hr. (11.14 min) per person daily, indicating an annual saving of 20,892 daily hours generating an annual savings of 184.7 million pesos. The project has been divided in two phases within a 32 year horizon, with 2 years of construction and 30 years of operation. The total cost of the project is 7,567,254,036.61 Mexican pesos (\$571,556,949.09 USD). The investment cost is 1,597.80 millions of pesos (\$120.73 million USD), 3,985 million pesos (\$301 million USD) in operations and 1,984.05 pesos (\$149.84 million USD) associated with public disturbances.

On the other hand, the project team developed some programs for enhancing the skills of local workers, promoting development and increasing employment opportunities is an educational

program called “Constructing and Growing.” The program has been developed in collaboration with a local NGO that focuses on providing educational skills to construction workers. Different levels of alphabetization intend to elevate the quality of construction and increase worker opportunities. The initiative helps them to conclude their studies by bolstering their knowledge and skills with various seminars or workshops. The program provides all the resources like classrooms, computers and academic materials.

Within the Leadership Category, stakeholders were aligned in order to generate sustainable practices to accomplish the major objective of this project: reducing traffic congestion. The agreements have been made with four different enterprises - Gami Ingeniería e Instalaciones, La Peninsular Compañía Constructora, Operadora y Administración Técnica, and Impulsora de Desarrollo Integral. They been regulated through different agencies within the Mexico City Government such as the Public Works Ministry, Environmental Ministry and the Public Space Authority. Although there is a great effort and intent of collaboration, the integral sustainable framework for driving environmental, social and economic impacts has not been defined. The project lacks information, studies and calculations to validate the various sustainable actions and impacts of this project. It is also important to indicate that due to the project’s scope and location within an urban area, the project performs under certain constraints determined by the nature of Mexico City’s urban fabric.

In relationship to the project’s management structure the project team designated a special team for handling a Quality Insurance Plan for monitoring, facilitating and leading the project management. The plan is separated into different elements such as planning and design processes, communication among the stakeholders and community, work environment, project construction and project performance monitoring. Moreover, most of the sustainable actions have been coordinated and supervised by the Mexico City Ministry of Environment (SEDEMA). Under their regulations, the project team has developed various sustainable practices for each of the selected interventions. The project team has also considered a long-term plan for future monitoring and maintenance of the highway with an estimated cost of 120 million pesos (\$886,103 USD) per year. This proposal has considered the maintenance of public infrastructure such as green areas, parks, sidewalks, garbage collection, pavement and other monitoring stations.

In regard to the allocation of materials, the most abundant material is concrete, however the project team has not specified the different sources. By law at least 25% of materials must be recycled, but the specifications regarding the use of recycled materials for concrete -clay, gravel or sand- has not been documented. One of the most relevant practices that have taken place is

related to the distribution of organic materials produced by excavation into the surrounding green areas. 1,724.10 of 17,241 cubic meters, or 10%, of the excavation by-products will be reused, while 15,516.9 cubic meters-- 90%-- will be recycled at industrial waste treatment enterprises. On the other hand, the project team has stood out in terms of energy reduction actions. The project will take advantage of Mexico City's solar energy potential by placing photovoltaic cells along the highway. This will help to reduce the amount of energy consumed by incorporating lighting design guidelines into the highway and other public spaces. Consequently these actions will support the neighborhood's walkability and security. Additionally, there is an endeavor related to carbon emission reductions by the improvement of traffic flow and mobility in different areas of the city. Although the impacts of this actions are substantial, they have not developed any calculation or study on this topic.

Due to Mexico City's environmental fragility, the project is distinguished in its accomplishment of a 100% reduction in potable water use. This is a major contribution in the frameworks for Resource Allocation and Natural World. Potable water has been replaced with the use of residual water and rainwater harvesting. Additionally, all vegetated surfaces will be irrigated with recycled or harvested water depending on the season of the year. The rain season in Mexico is from June to September, therefore green areas will be irrigated with rainwater during that time. The landscape proposal also stipulates that different vegetation types will support landscape functions for groundwater management for capturing stormwater.

Moreover, in relationship to the Natural World category the project does not alter any floodplain or natural function as the complex hydraulic infrastructure system has been dramatically transformed in the past and the proposal does not affect its current circumstances. Specifically, the Avenue Rio Churubusco forms part of the basic drainage and sewage infrastructure which is connected to the General Drainage System of the Valley of Mexico, but none of the interventions interfere with the system, as they are completely disconnected. The integration of green areas also mitigates some of the climate threats that Mexico City faces.

In sum, throughout the different categories of Envision, the project team strived to develop several sustainable strategies, from improving the quality of life of numerous users of the Interior Circuit Highway to mitigating heat island effects. In regards to Resource Allocation, the project team developed mechanisms for recycling materials and excelled in a 100% reduction of potable water use. Being a project focused on infrastructure redevelopment and improvement, the project will not only build upon one Mexico City's most important transportation corridors, but it will also take advantage of its strategic location in order to provide other amenities. Mobility infrastructure projects such as the Interior Circuit are of great influence in a city like

Mexico City, as these corridors are the backbones of development. Its impact traverses a wide range of categories, from improving quality of life to enhancing economic development while reducing vehicle pollution.

Moreover, the project is providing great assets to a vast number of inhabitants through a series of relatively small interventions throughout the city, facilitating day-to-day mobility and assuring other sustainable parameters such as water and energy reduction. Accepting that the highway is only a part of the overall proposal, the project enacted strong community-driven strategies like the introduction of public spaces, pedestrian bridges and green areas for water capturing. The proposal has also considered a long-term maintenance project, which will further contribute to urban development in Mexico City. The project team strived to implement various sustainable practices and has balanced all of its components into an integrative mobility strategy.

This report evaluates the sustainability performance of the Urban Improvement and Integral Management of Mexico City's Interior Circuit project according to the Envision™ Rating System. The report identifies areas in which the project scored highly, as well as low-scoring areas that represent opportunities for which the project team can learn and improve on in future projects, as they strive to achieve sustainable project design and construction methodologies.

APPENDIX:

APPENDIX A: PROJECT PICTURES AND DRAWINGS



Figure 02: Urban bridges of Mexico City, 2005.

Sources: Murguía Consultores, "Estudio de Riesgos para operadora y mantenedora del Circuito Interior, S. A de C. V. Por las Obras de Mejoramiento Urbano y Mantenimiento Integral del Circuito Interior de la Ciudad de México" (Ciudad de México, 2014). P. 45



Figure 03: Image towards southern part of Revolution Avenue.
Sources: Photographic Report from Traffic Impact Study. P.1



Figure 03: Image towards southern part of Revolution Avenue.
Sources: Photographic Report from Traffic Impact Study. P.6



Figure 04: Bridge under construction.
Sources: Photographic Report from Grupo Indi.

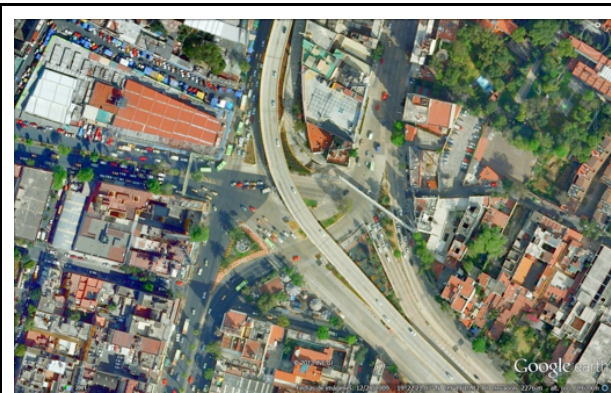


Figure 05: Molinos Bridge
Sources: Traffic Impact Study Vehicular Bridge Revolución-Molinos. Second Phase P.1



Figure 06: Revolución-Molinos Bridge
Sources: Secretaría de Obras y Servicios, Dirección de Comunicación Social. *Comunicación Social*. (Ciudad de México, 2013).



Figure 07: Ramp in Tlalpan
Sources: Secretaría de Obras y Servicios, Dirección de Comunicación Social. *Comunicación Social*. (Ciudad de México, 2013).



Figure 08: Tezontle Bridge
Sources: Secretaría de Obras y Servicios, Dirección de Comunicación Social. *Comunicación Social*. (Ciudad de México, 2013).



Figure 09: Bridge Oriente Avenue
Sources: Secretaría de Obras y Servicios, Dirección de Comunicación Social. *Comunicación Social*. (Ciudad de México, 2013).



Figure 10: View from Churubusco River
Sources: Secretaría de Obras y Servicios, Dirección de Comunicación Social. *Comunicación Social*. (Ciudad de México, 2013).



Figure 11: Double Tunnel Mixcoac
Sources: Secretaría de Obras y Servicios, Dirección de Comunicación Social. *Comunicación Social*. (Ciudad de México, 2013).



Figure 12: Pedestrian Bridge Tezontle
Sources: Secretaría de Obras y Servicios, Dirección de Comunicación Social. *Comunicación Social*. (Ciudad de México, 2013).



Figure 13: View from Churubusco River

Sources: Secretaría de Obras y Servicios, Dirección de Comunicación Social. *Comunicación Social*. (Ciudad de México, 2013).



Figure 14: Insurgentes Avenue View

Sources: Secretaría de Obras y Servicios, Dirección de Comunicación Social, *Tríptico Programa Integral de Rehabilitación del Circuito Interior*. (Ciudad de México, 2014).



Figure 15: Insurgentes Avenue Roundabout.

Sources: Secretaría de Obras y Servicios, Dirección de Comunicación Social, *Tríptico Programa Integral de Rehabilitación del Circuito Interior*. (Ciudad de México, 2014).



Figure 16: Revolución – Molinos Construction Site

Sources: Photographic Report from Grupo Indi.

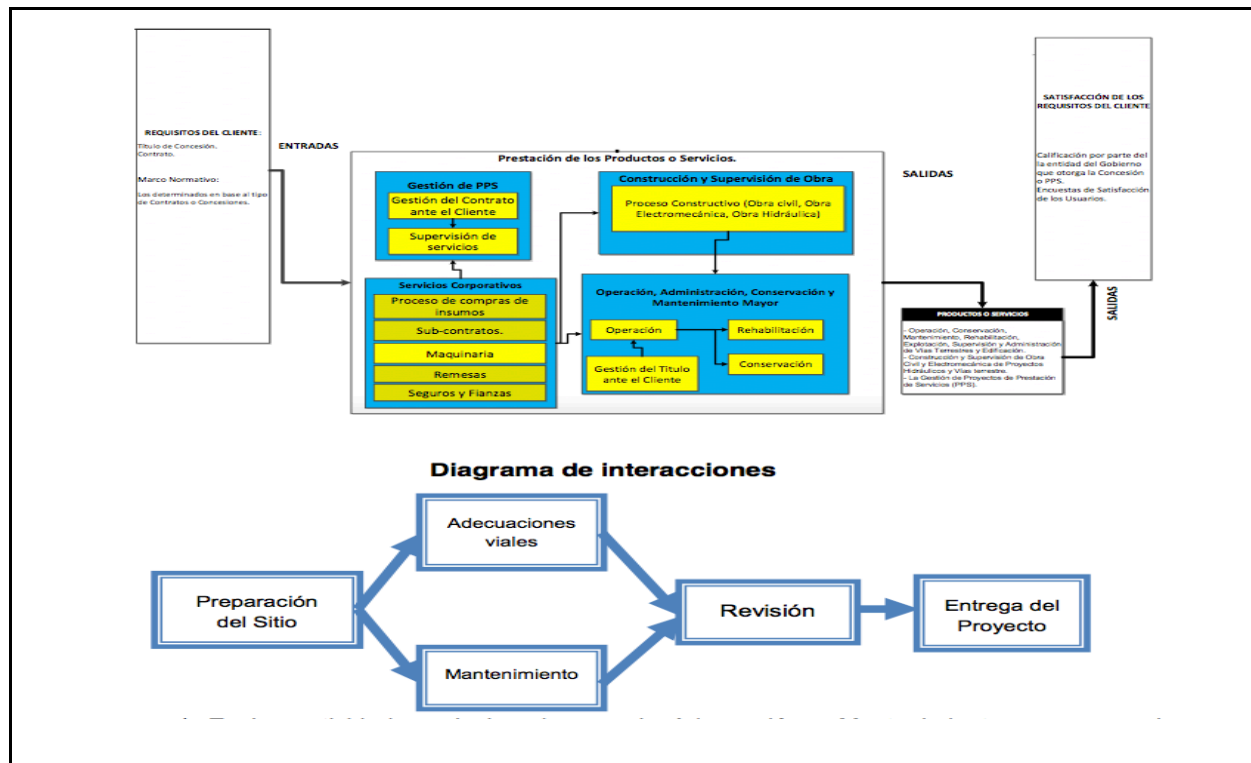


Figure 17: Management Quality Plan

Sources: OMCI, “Plan de Aseguramiento de Calidad. Proyecto: Mejoramiento Urbano y Mantenimiento Integral del Circuito Interior de la Ciudad de México, que incluye la implementación de soluciones y adecuaciones viales” (Ciudad de México, 2014).



Figure 18: Material Allocation at Tezontle Avenue

Sources: Photographic Report from Grupo Indi.



Figure 19: Maintenance

Sources: Fotografic Report from Grupo Indi.

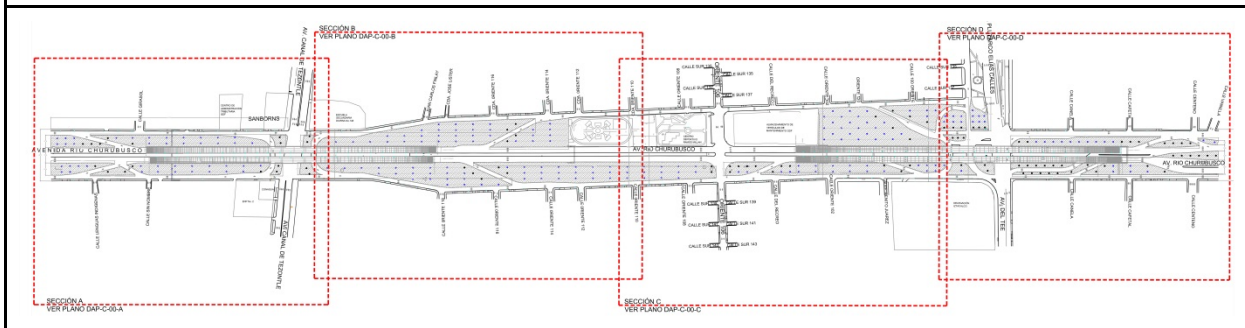


Figure 20: Landscape Design, Interior Circuit.

Sources: -Espacios Verdes Integrales SA de CV, "Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Areas Verdes para el Proyecto Distribuidor Vial Talpan" (Ciudad de México, 2014).

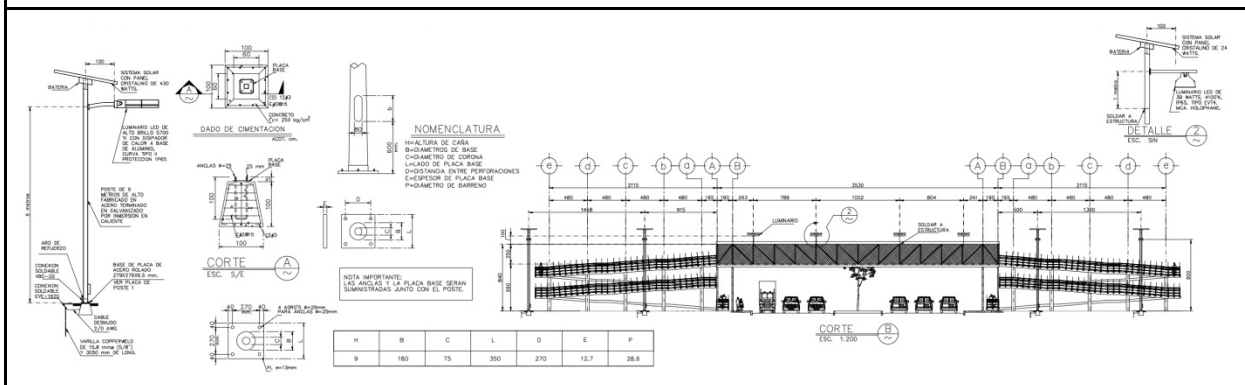


Figure 21: Lighting System Detail.

Sources: Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales. *Plano de Luminarias y Sistemas de Alumbrado*. (Ciudad de México, 2013).

APPENDIX B: ENVISION POINTS TABLE

CREDIT SCORING

			IMPROVED	ENHANCED	SUPERIOR	CONSERVING	RESTORATIVE		
1	QUALITY OF LIFE	PURPOSE	QL1.1 Improve community quality of life	2	5	10	20	25	
2			QL1.2 Stimulate sustainable growth and development	1	2	5	13	16	
3			QL1.3 Develop local skills and capabilities	1	2	5	12	15	
4		COMMUNITY	QL2.1 Enhance public health and safety	2			16		
5			QL2.2 Minimize noise and vibration	1			8	11	
6			QL2.3 Minimize light pollution	1	2	4	8	11	
7			QL2.4 Improve community mobility and access	1	4	7	14		
8			QL2.5 Encourage alternative modes of transportation	1	3	6	12	15	
9			QL2.6 Improve site accessibility, safety and wayfinding	1	3	6	12	15	
10		WELLBEING	QL3.1 Preserve historic and cultural resources	1		7	13	16	
11			QL3.2 Preserve views and local character	1	3	6	11	14	
12			QL3.3 Enhance public space	1	3	6	11	13	
			Maximum points possible:				181		
13	LEADERSHIP	COLLABORATION	LD1.1 Provide effective leadership and commitment	2	4	9	17		
14			LD1.2 Establish a sustainability management system	1	4	7	14		
15			LD1.3 Foster collaboration and teamwork	1	4	8	15		
16			LD1.4 Provide for stakeholder involvement	1	5	9	14		
17		MANAGEMENT	LD2.1 Pursue by-product synergy opportunities	1	3	6	12	15	
18			LD2.2 Improve infrastructure integration	1	3	7	13	16	
19			LD3.1 Plan for long-term monitoring and maintenance	1	3		10		
20		PLANNING	LD3.2 Address conflicting regulations and policies	1	2	4	8		
21			LD3.3 Extend useful life	1	3	6	12		
			Maximum points possible:				121		
22	RESOURCE ALLOCATION	MATERIALS	RA1.1 Reduce net embodied energy	2	6	12	18		
23			RA1.2 Support sustainable procurement practices	2	3	6	9		
24			RA1.3 Use recycled materials	2	5	11	14		
25			RA1.4 Use regional materials	3	6	9	10		
26			RA1.5 Divert waste from landfills	3	6	8	11		
27			RA1.6 Reduce excavated materials taken off site	2	4	5	6		
28			RA1.7 Provide for deconstruction and recycling	1	4	8	12		
29		ENERGY	RA2.1 Reduce energy consumption	3	7	12	18		
30			RA2.2 Use renewable energy	4	6	13	16	20	
31			RA2.3 Commission and monitor energy systems		3		11		
32		WATER	RA3.1 Protect fresh water availability	2	4	9	17	21	
33			RA3.2 Reduce potable water consumption	4	9	13	17	21	
34			RA3.3 Monitor water systems	1	3	6	11		
			Maximum points possible:				182		
35		NATURAL WORLD	SITING	NW1.1 Preserve prime habitat			9	14	18
36	NW1.2 Protect wetlands and surface water			1	4	9	14	18	
37	NW1.3 Preserve prime farmland					6	12	15	
38	NW1.4 Avoid adverse geology			1	2	3	5		
39	NW1.5 Preserve floodplain functions			2	5	8	14		
40	NW1.6 Avoid unsuitable development on steep slopes			1		4	6		
41	NW1.7 Preserve greenfields			3	6	10	15	23	
42	LAND & WATER		NW2.1 Manage stormwater		4	9	17	21	
43			NW2.2 Reduce pesticide and fertilizer impacts	1	2	5	9		
44			NW2.3 Prevent surface and groundwater contamination	1	4	9	14	18	
45	BIODIVERSITY		NW3.1 Preserve species biodiversity	2			13	16	
46			NW3.2 Control invasive species			5	9	11	
47			NW3.3 Restore disturbed soils				8	10	
48			NW3.4 Maintain wetland and surface water functions	3	6	9	15	19	
			Maximum points possible:				203		
49	CLIMATE & RISK	EMISSIONS	CR1.1 Reduce greenhouse gas emissions	4	7	13	18	25	
50			CR1.2 Reduce air pollutant emissions	2	6		12	15	
51		RESILIENCE	CR2.1 Assess climate threat				15		
52			CR2.2 Avoid traps and vulnerabilities	2	6	12	16	20	
53			CR2.3 Prepare for long-term adaptability				16	20	
54			CR2.4 Prepare for short-term hazards	3		10	17	21	
55			CR2.5 Manage heat islands effects	1	2	4	6		
			Maximum points possible:				116		
							803		

*The five innovation credits are bonus points and not included in total point tallies

APPENDIX C: GRAPHS

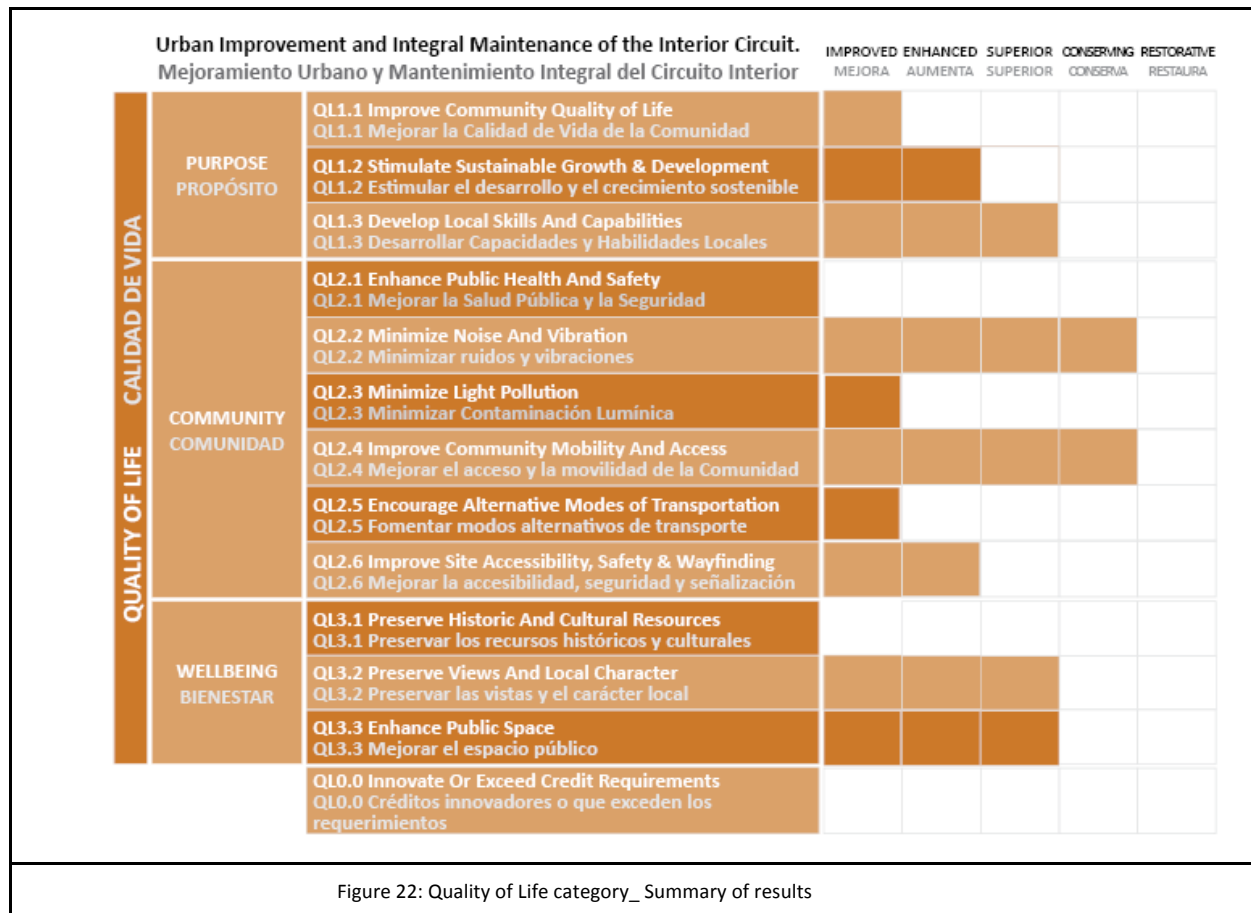


Figure 22: Quality of Life category_ Summary of results

		IMPROVED	ENHANCED	SUPERIOR	CONSERVING	RESTORATIVE
		MEJORA	AUMENTA	SUPERIOR	CONSERVA	RESTAURA
LIDERAZGO	COLLABORATION COLABORACIÓN	LD1.1 Provide Effective Leadership And Commitment LD1.1 Proporcionar compromiso y liderazgo efectivo				
		LD1.2 Establish A Sustainability Management System LD1.2 Establecer un sistema de gestión de la sostenibil-				
		LD1.3 Foster Collaboration And Teamwork LD1.3 Promover Colaboración y trabajo en equipo				
		LD1.4 Provide For Stakeholder Involvement LD1.4 Fomentar la participación de las partes interesadas				
MANAGEMENT GESTIÓN	LD2.1 Pursue By-Product Synergy Opportunities LD2.1 Buscar oportunidades de sinergia derivada					
	LD2.2 Improve Infrastructure Integration LD2.2 Mejorar la integración de infraestructuras					
PLANNING PLANIFICACIÓN	LD3.1 Plan For Long-Term Monitoring & Maintenance LD3.1 Planificar el monitoreo y mantenimiento a largo plazo					
	LD3.2 Address Conflicting Regulations & Policies LD3.2 Lidar con reglamentos y políticas en conflicto					
	LD3.3 Extend Useful Life LD3.3 Extender la vida útil					
	LD0.0 Innovate Or Exceed Credit Requirements LD0.0 Créditos innovadores o que exceden los requerimientos					

Figure 23: Leadership category_ Summary of results

Urban Improvement and Integral Maintenance of the Interior Circuit. Mejoramiento Urbano y Mantenimiento Integral del Circuito Interior		IMPROVED MEJORA	ENHANCED AUMENTA	SUPERIOR SUPERIOR	CONSERVING CONSERVA	RESTORATIVE RESTAURA
RESOURCE ALLOCATION ASIGNACIÓN DE RECURSOS	MATERIALS MATERIALES	RA1.1 Reduce Net Embodied Energy RA1.1 Reducir energía neta incorporada				
		RA1.2 Support Sustainable Procurement Practices RA1.2 Apoyar prácticas de adquisición sustentable				
		RA1.3 Used Recycled Materials RA1.3 Utilizar materiales reciclados				
		RA1.4 Use Regional Materials RA1.4 Utilizar materiales de la región				
		RA1.5 Divert Waste From Landfills RA1.5 Disminuir la disposición final en rellenos sanitarios				
		RA1.6 Reduce Excavated Materials Taken Off Site RA1.6 Reducir los materiales de excavación sacados del local del proyecto				
		RA1.7 Provide for Deconstruction & Recycling RA1.7 Prever condiciones para la remoción de la construcción y el reciclaje				
	ENERGY ENERGÍA	RA2.1 Reduce Energy Consumption RA2.1 Reducir el consumo de energía				
		RA2.2 Use Renewable Energy RA2.2 Usar energías renovables				
		RA2.3 Commission & Monitor Energy Systems RA2.3 Puesta en servicio y monitoreo de sistemas energéticos				
	WATER AGUA	RA3.1 Protect Fresh Water Availability RA3.1 Proteger la disponibilidad de agua dulce				
		RA3.2 Reduce Potable Water Consumption RA3.2 Reducir el consumo de agua potable				
		RA3.3 Monitor Water Systems RA3.3 Monitorear sistemas de provisión de agua				
		RA0.0 Innovate Or Exceed Credit Requirements RA0.0 Créditos innovadores o que exceden los requerimientos				

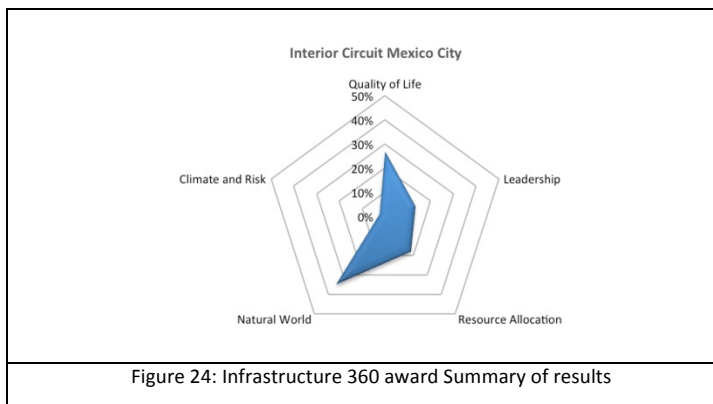
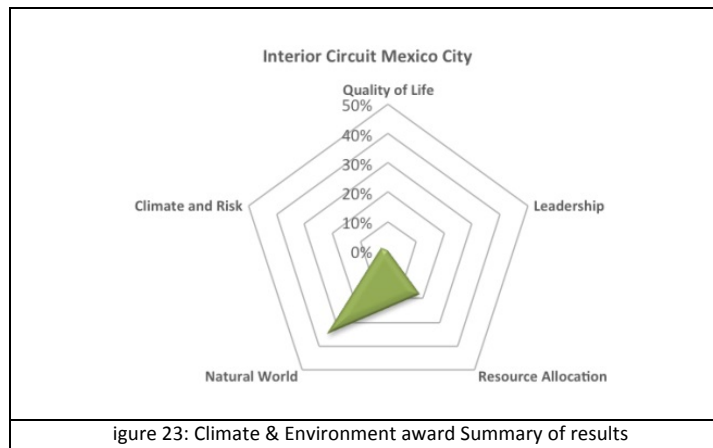
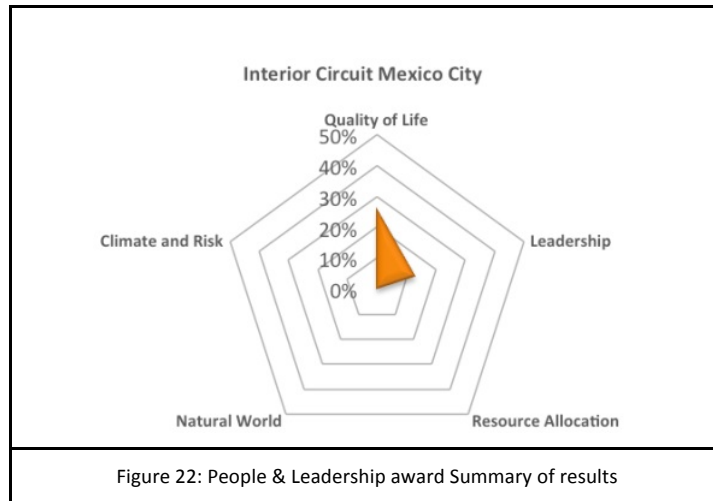
Figure 24:Resource Allocation category_ Summary of results

Urban Improvement and Integral Maintenance of the Interior Circuit. Mejoramiento Urbano y Mantenimiento Integral del Circuito Interior			IMPROVED MEJORA	ENHANCED AUMENTA	SUPERIOR SUPERIOR	CONSERVING CONSERVA	RESTORATIVE RESTAURA
MUNDO NATURAL	SITING EMPLAZAMIENTO	NW1.1 Preserve Prime Habitat NW1.1 Preservar hábitats de alta calidad					
		NW1.2 Preserve Wetlands and Surface Water NW1.2 Preservar humedales y aguas superficiales					
		NW1.3 Preserve Prime Farmland NW1.3 Preservar tierras agrícolas de alta calidad					
		NW1.4 Avoid Adverse Geology NW1.4 Evitar zonas de geología adversa					
		NW1.5 Preserve Floodplain Functions NW1.5 Preservar funciones de llanura aluvial					
		NW1.6 Avoid Unsuitable Development on Steep Slopes NW1.6 Evitar la ocupación inadecuada en pendientes pronunciadas					
		NW1.7 Preserve Greenfields NW1.7 Preservar áreas sin ocupación					
NATURAL WORLD	LAND + WATER IMPACTOS EN EL AGUA Y SUELO	NW2.1 Manage Stormwater NW2.1 Gestión de aguas pluviales					
		NW2.2 Reduce Pesticides and Fertilizer Impacts NW2.2 Reducir el impacto de fertilizantes y plaguicidas					
		NW2.3 Prevent Surface and Groundwater Contamination NW2.3 Prevenir la contaminación de aguas superficiales y profundas					
BIODIVERSITY BIODIVERSIDAD		NW3.1 Preserve Species Biodiversity NW3.1 Preservar la biodiversidad					
		NW3.2 Control Invasive Species NW3.2 Control de especies invasivas					
		NW3.3 Restore Disturbed Soils NW3.3 Restaurar suelos alterados					
		NW3.4 Maintain Wetland and Surface Water Functions NW3.4 Preservar los humedales y las funciones de aguas superficiales					
		NW0.0 Innovate or Exceed Credit Requirements NW0.0 Créditos innovadores o que exceden los requerimientos					

Figure 25: Natural World category_ Summary of results

Urban Improvement and Integral Maintenance of the Interior Circuit. Mejoramiento Urbano y Mantenimiento Integral del Circuito Interior			IMPROVED MEJORA	ENHANCED AUMENTA	SUPERIOR SUPERIOR	CONSERVING CONSERVA	RESTORATIVE RESTAURA
CLIMATE AND RISK CLIMA Y RIESGO	EMISSIONS EMISIONES	CR1.1 Reduce Greenhouse Gas Emissions CR1.1 Reducir las emisiones de Gases de Efecto Invernadero (GEI)					
		CR1.2 Reduce Air Pollutant Emissions CR1.2 Reducir las emisiones contaminantes del aire					
	RESILIENCE RESILIENCIA	CR2.1 Assess Climate Threat CR2.1 Evaluar amenazas relacionadas al Cambio Climático					
		CR2.2 Avoid Traps And Vulnerabilities CR2.2 Evitar situaciones de riesgo y vulnerabilidad					
		CR2.3 Prepare For Long-Term Adaptability CR2.3 Establecer estrategias de adaptación de largo plazo, frente al Cambio Climático					
		CR2.4 Prepare For Short-Term Hazards CR2.4 Preparación frente a riesgos de corto plazo					
		CR2.5 Manage Heat Island Effects CR2.5 Administrar el efecto Isla de Calor					
		CR0.0 Innovate Or Exceed Credit Requirements CR0.0 Créditos innovadores o que exceden los requerimientos					

Figure 26: Climate & Risk category_ Summary of results



Urban Improvement and Integral Maintenance of the Interior Circuit, Mexico.	PT.	Performance
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Urban Improvement and Integral Maintenance of the Interior Circuit, Mexico

1	QUALITY OF LIFE	PURPOSE	QL1.1 Improve Community Quality of Life	2	Improved
2			QL1.2 Stimulate Sustainable Growth & Development	2	Enhanced
3			QL1.3 Develop Local Skills And Capabilities	5	Superior
4		COMMUNITY	QL2.1 Enhance Public Health And Safety	0	No Score
5			QL2.2 Minimize Noise And Vibration	8	Conserving
6			QL2.3 Minimize Light Pollution	1	Improved
7			QL2.4 Improve Community Mobility And Access	14	Conserving
8			QL2.5 Encourage Alternative Modes of Transportation	1	Improved
9			QL2.6 Improve Site Accessibility, Safety & Wayfinding	3	Enhanced
10		WELLBEING	QL3.1 Preserve Historic And Cultural Resources	0	No Score
11			QL3.2 Preserve Views And Local Character	6	Superior
12			QL3.3 Enhance Public Space	6	Superior
		QL0.0 Innovate Or Exceed Credit Requirements	0	0	
		QL	48		
Urban Improvement and Integral Maintenance of the Interior Circuit, Mexico.				PT.	Performance
13	LEADERSHIP	COLLABORATION	LD1.1 Provide Effective Leadership And Commitment	4	Enhanced
14			LD1.2 Establish A Sustainability Management System	1	Improved
15			LD1.3 Foster Collaboration And Teamwork	1	Improved
16			LD1.4 Provide For Stakeholder Involvement	1	Improved
17		MNGMT.	LD2.1 Pursue By-Product Synergy Opportunities	0	No Score
18			LD2.2 Improve Infrastructure Integration	7	Superior
19		PLANNING	LD3.1 Plan For Long-Term Monitoring & Maintenance	1	Improved
20			LD3.2 Address Conflicting Regulations & Policies	0	No score
21			LD3.3 Extend Useful Life	1	Improved.
			LD0.0 Innovate Or Exceed Credit Requirements	0	N/A
		LD	16		
Urban Improvement and Integral Maintenance of the Interior Circuit, Mexico.				PT.	Performance
22	RESOURCE ALLOCATION	MATERIALS	RA1.1 Reduce Net Embodied Energy	0	No Score
23			RA1.2 Support Sustainable Procurement Practices	2	Improved
24			RA1.3 Used Recycled Materials	2	Improved
25			RA1.4 Use Regional Materials	0	No score
26			RA1.5 Divert Waste From Landfills	3	Improved
27			RA1.6 Reduce Excavated Materials Taken Off Site	2	Improved
28			RA1.7 Provide for Deconstruction & Recycling	0	No Score.
29		ENERGY	RA2.1 Reduce Energy Consumption	3	Improved
30			RA2.2 Use renewable energy	0	No score
31			RA2.3 Commission & Monitor Energy Systems	0	No score.
32		WATER	RA3.1 Protect Fresh Water Availability	2	Improved
33			RA3.2 Reduce Potable Water Consumption	17	Conserving
34			RA3.3 Monitor Water Systems	0	No score
		RA0.0 Innovate Or Exceed Credit Requirements	0	N/A	
		RA	31		

Urban Improvement and Integral Maintenance of the Interior Circuit, Mexico

Urban Improvement and Integral Maintenance of the Interior Circuit, Mexico.			PT.	Performance		
35	NATURAL WORLD	SITING	NW1.1 Preserve Prime Habitat	9	Superior	
36			NW1.2 Preserve Wetlands and Surface Water	0	No score	
37			NW1.3 Preserve Prime Farmland	12	Conserving	
38			NW1.4 Avoid Adverse Geology	1	Improved	
39			NW1.5 Preserve Floodplain Functions	5	Enhanced	
40			NW1.6 Avoid Unsuitable Development on Steep Slopes	6	Conserving	
41			NW1.7 Preserve Greenfields	15	Conserving	
42		L & W	NW2.1 Manage Stormwater	4	Enhanced	
43			NW2.2 Reduce Pesticides and Fertilizer Impacts	2	Enhanced	
44			NW2.3 Prevent Surface and Groundwater Contamination	1	Improve	
45		BIODIVERSITY	NW3.1 Preserve Species Biodiversity	0	No score	
46			NW3.2 Control Invasive Species	5	Superior	
47			NW3.3 Restore Disturbed Soils	8	Conserving	
48			NW3.4 Maintain Wetland and Surface Water Functions	3	Improved	
			NW0.0 Innovate or Exceed Credit Requirements	0	N/A	
			NW	71		
Urban Improvement and Integral Maintenance of the Interior Circuit, Mexico.			PT.	Performance		
49	CLIMATE	EMISSION	CR1.1 Reduce Greenhouse Gas Emissions	0	No score	
50			CR1.2 Reduce Air Pollutant Emissions	2	Improved	
51		RESILIENCE	CR2.1 Assess Climate Threat	0	No score	
52			CR2.2 Avoid Traps And Vulnerabilities	0	No score	
53			CR2.3 Prepare For Long-Term Adaptability	0	No score	
54			CR2.4 Prepare For Short-Term Hazards	0	No score	
55			CR2.5 Manage Heat Island Effects	1	Improved	
			CR0.0 Innovate Or Exceed Credit Requirements	0	N/A	
			CR	3		
Total points			169	0		

APPENDIX D: CREDIT DETAIL

CATEGORY I, PEOPLE AND LEADERSHIP		
SUB CATEGORY: QUALITY OF LIFE		
	Score	Urban Improvement and Integral Maintenance of the Interior Circuit, Mexico.
QL1.1 Improve Community Quality of Life	2	Improved
		<p>The project is focused around ameliorating one of the most important highways in Mexico City, the Interior Circuit. It succeeds in addressing immediate needs of the users of this highway, which has an average traffic volume of 69,422 vehicles. Lost commuter time due to low traffic speed is excessive and has already reached its capacity limit within peak and non-peak hours. Bridges, tunnels, and red light improvements have been proposed in order to increase the circulation rate. The project will save a total time of 0.19 hr. (11.14 min) per person daily, indicating an annual savings of 20,892 daily hours, generating an annual savings of 184.7 millions of pesos, reflecting a better quality of life with numerous social and economical benefits.</p> <p>Detailed studies are presented at the level of the driver --99.3 % private cars-- but no significant information has been provided about the study of neighboring districts. Among such studies, thirty were made in order to identify the time and costs related to the low circulation speed. The studies reveal that the average commute time, from Molinos to Tezontle Avenue and vice versa, is 32.8 minutes at an average rate of 31.8 km/hr. This rate is substantially below the road's initial designed speed. Specific improvements and strategic interventions at intersections will substantially increase the average speed from 35km/h to 65 km/h. This will signify considerable advantages for the community and users of this important highway, elevating the social and time benefits of this project.</p>
		<p><u>Source:</u> <i>Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales, Dirección de Construcción de Proyectos Especiales "A". Evaluación Socioeconómica, Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México. (Ciudad de México, 2013), 9-18.</i></p>
<p><u>RECOMMENDATIONS</u></p> <p><i>The project should engage with neighboring districts in order to identify other problems, needs, goals and issues related to each of the areas of intervention. The project only focused on private car users and did not establish any connection with surrounding districts. More detailed information about the community impacts and long-term vision of the area is lacking. The project appears to be mainly focused on traffic analysis. The documentation does not provide details on other public space or public services. More involvement with neighboring communities as part of the design or decision-making process is recommended. Submit documents that demonstrate that the community stakeholders endorsed or participated in the project.</i></p>		
QL1.2	2	Enhanced

<p>Stimulate Sustainable Growth & Development</p>		<p>The road’s heavy traffic, low speed rate and interrupted circulation are some of the major problems that the nearby community confronts. Given that the project is located in an urban area, alternatives have been specified for the following intersections: Molinos – Revolución, Circuito Interior – Insurgentes Sur, Circuito Interior – Plutarco Elías Calles, Circuito Interior – Ote 106 Avenue and Circuito Interior – Tezontle Avenue. The project aligns itself to community needs by identifying three main problems: a) Intersections with traffic lights b) Intersections with English turns (left turns) c) Coalescence of multiple streets (traffic inputs and outputs). Bridges, tunnels and red light modifications have been situated throughout 16.5 km of the Interior Circuit. The selected intersections improved the socio-economic conditions of the community by ameliorating the urban identity and facilitating access, flow and circulation around such areas. The project presented substantial time-cost savings estimated at 400 million pesos (29.8 million USD) per year, by improving traffic speed. Studies and plans related to the urban areas and surrounding neighborhoods demonstrate the creation of recreational areas, specifically at the intersection with Insurgentes Avenue. At this intersection, the project will also create a roundabout and a linear park, which will give a new identity to the public realm. However, the other intersections selected present an infrastructural assessment that has focused mainly on private modes of transportation and traffic analysis.</p>
		<p><i>Source: Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales, Dirección de Construcción de Proyectos Especiales “A”. Evaluación Socioeconómica, Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México. (Ciudad de México, 2013).</i></p>
		<p>RECOMMENDATIONS</p> <p><i>The project’s infrastructure has been mainly presented through traffic flow analysis. Being its main problematic, the project impact and community improvement has been mainly focused on the road’s quality. It is recommended to engage with an urban impact analysis that comprehends and imagines ways in which each intersection will transform its urban identity. Consider and evaluate the job creation impact that the project will have before, during and after its construction.</i></p>
<p>QL1.3 Develop Local Skills and Capabilities</p>	<p>5</p>	<p>Superior</p> <p>According to the documentation submitted, in terms of hiring practices, local firms and local workers from the surrounding areas of influence will be prioritized. A great majority of the workers hired are from the area of influence, although there is a considerable number who come from other provinces in Mexico. The project will also contribute to local employment and education with a strategic alliance with an NGO through the program “Construyendo y Aprendiendo” (Constructing and Growing). This program will provide skills at different levels to a determinate number of workers, from alphabetization to high school education. This initiative attempts to elevate the quality of construction while promoting an educational emphasis. According to the first clause, the developer and the “Construyendo y Aprendiendo” program undertake the mission of developing and sharing integral educational programs. The program includes classes for workers, assessing their corresponding academic year and helping them to conclude their studies, expanding their knowledge, skills and capacity.</p> <p><i>Source: Operadora y Mantenedora del Circuito Interior. Construyendo y Creciendo, Convenio de Colaboración en Materia Intervención Educativa. (México, Distrito Federal, 2014)</i></p> <p>RECOMMENDATIONS</p> <p><i>The project engages with the local community and expands knowledge and skills through the “Construyendo y Aprendiendo” program. It is recommended that the persons selected to be part of this program belong to the local community in order to generate and contribute to long-term competitiveness.</i></p>

<p>QL2.1 Enhance Public Health And Safety</p>	<p>0</p>	<p>No Score</p> <p><i>Source: No score</i></p> <p><u>RECOMMENDATIONS</u></p> <p><i>Present more documentation on the Risk Analysis. Include possible risk exposure and plans for reducing risks associated to new technologies, methodologies or materials. Develop an evaluation agreement that has gained approval from the appropriate environmental and public health officials. Make progress on health and safety methodologies and protocols during the construction phase. Systematic and further documentation about this topic has not been submitted and the guidelines do not specify the application of new materials and/or technologies whose risks needs to be evaluated.</i></p>
<p>QL2.2 Minimize Noise And Vibration</p>	<p>8</p>	<p>Conserving</p> <p>According to the NOM-080-SEMARNAT-1994, noise emissions will be minimized. Noise emissions are related to vehicles and the range is between 86dB (vehicles below 3,000 kg) to 92 dB (vehicles above 10,000 kg). These ranges are related to the normativity of the gross weight used during construction, indicated in the article 29 of the RPACCOER. This regulation applies to all of the four interventions made throughout the Interior Circuit. Additionally, given the article 36 of the RPACCOER, loading and unloading operations realized on the public domain won't exceed 90 dB (A) level from 7:00 hrs. to 22:00 hrs and 85 dB (A) from 22:00 hrs to 7:00 hrs. All construction works have been adjusted to the parameters of current regulations. These regulations will be supervised at the four specific interventions on the intersection with Plutarco Elias Calles Road, Tezontle Avenue and Revolution Avenue, Oriente 106 Avenue and Insurgentes Avenue. Each of these regulations have been specified at the Administrative Resolution of each area. No plans for vibration and monitoring have been submitted.</p> <p><i>Source: Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Plutarco E. Calles.(Ciudad de México, 2013). 23</i></p> <p><i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Molinos.(Ciudad de México, 2013). 22</i></p> <p><i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tezontle.(Ciudad de México, 2013). 25</i></p> <p><i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tlalpan.(Ciudad de México, 2013). 20</i></p> <p><u>RECOMMENDATIONS</u></p> <p><i>Submit the proposal regarding vibration mitigation and monitoring. Also, develop noise and vibration studies to provide adequate baseline information for construction regulations. As this project is located in an urban area, noise control and mitigation should be monitored and documented. This will enhance the project's performance and minimize the disturbance to adjacent properties.</i></p>
<p>QL2.3 Minimize Light Pollution</p>	<p>1</p>	<p>Improved</p> <p>The project team has conducted an overall assessment of the lightning needs of the project, in accordance with the government's regulations. The amelioration of the Interior Circuit includes public lighting components, which are specified in the design plans submitted by the Secretary of Public Works and Services. Light pollution studies are of high importance due to the project's urban location and more detailed information is required for analyzing this matter. According to the Administrative Resolution in the Energy chapter and based on Article 123 in the LAPTFD, all lighting should entail low-pollution emissions and energy saving bulbs.</p>

	<p>Nonetheless, the information submitted does not fully inform or demonstrate that the constructed work will follow the required standards.</p> <p><i>Source: Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales. Plano de Luminarias y Sistemas de Alumbrado. (Ciudad de México, 2013).</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Plutarco E. Calles.(Ciudad de México, 2013). 26</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Molinos.(Ciudad de México, 2013).</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tezontle.(Ciudad de México, 2013).</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tlalpan.(Ciudad de México, 2013).</i></p> <p>RECOMMENDATIONS</p> <p><i>Develop lightning assessments and establish appropriate lightning zones for this project. Do not only include the regulation’s requirements, but also integrate the measure to preserve the night sky. Due to the urban location of this project, reduce lighting energy requirements to direct light only where needed. Present plans, drawings and specifications show reductions in light intensity, light zones, the use of high barriers and timed lightning needs.</i></p>
<p>QL2.4 Improve Community Mobility And Access</p>	<p>14</p> <p>Conserving</p> <p>One of the main aspects of the project is the improvement of community mobility, access and connectivity around the area. In sum, the benefits of the intervention are rendered in a total saved time of 11.14 min per person daily, or annual savings of 20,892 hours and 13.6 million USD (184.7 million pesos). All of these assets are reflected in promoting a better quality of life, while extending social and economical benefits. The selected intersections improve the socio-economic conditions of the community by ameliorating the urban identity and facilitating access, flow and circulation around such areas. The project design considerations addressed traffic reduction and mobility in the Interior Circuit of Mexico City. The time lost due to low traffic flow is excessive, and the highway has already reached its capacity volume for both peak and non-peak hours. The studies reveal that the average time, from Molinos to Tezontle Avenue and vice versa, is 32.8 minutes at an average rate of 31.8 km/hr. This rate is substantially below the initial road’s design speed. Specific improvements and strategic interventions at the intersections will substantially increase the average speed from 35km/h to 65 km/h. Bridges, tunnels and red light improvements have been proposed in order to increase the speed and circulation rate and to improve the continuity of the road. During construction, the Federal District Secretary of Transport and Mobility will coordinate a special detour program. This program will support the transit system so as to minimize the effect of the construction. These protocols will apply to all the intersections identified.</p> <p><i>Source: Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales, Dirección de Construcción de Proyectos Especiales “A”. Evaluación Socioeconómica, Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México. (Ciudad de México, 2013).</i> <i>Grupo Sacmag. Estudio de Impacto Vial, Puente Vehicular Revolución Molinos 2a. Etapa. (México, Distrito Federal, 2013).</i> <i>Grupo Sacmag. Estudio de Impacto Vial, Distribuidor Vial Tlalpan - Churubusco. (México, Distrito Federal, 2013).</i> <i>Grupo Sacmag. Estudio de Impacto Vial, Paso Deprimido Vehicular, Av. Insurgentes y Av. Rio Mixcoac (Circuito Bicentenario) – Moras – Hestia. (México, Distrito Federal, 2013).</i> <i>Grupo Sacmag. Estudio de Ingeniería de Transito para los Pasos a Desnivel de Tezontle, Oriente 106 y Eje 4 Sur con el Circuito Bicentenario del Distrito Federal. (México, Distrito Federal, 2013).</i></p>

		<p><u>RECOMMENDATIONS</u></p> <p><i>Include assessment studies and reports addressing the effects of the construction on access and mobility. Also, prepare documentation, reports, and minutes of meetings with managers and operators about access to adjacent facilities, amenities and transportation hubs. Specifications of requirements and procedures directed to the constructor will support the project.</i></p>
<p>QL2.5 Encourage Alternative Modes of Transportation</p>	<p>1</p>	<p>Improved</p> <p>The project consists of a series of bridges, tunnels, and red light modifications that have been situated at different interventions throughout 16.5 km of the Interior Circuit. Elements of pedestrian accessibility have been considered through pedestrian walkways and bridges. The intervention that is better assessed in these terms is located at the intersection with Insurgentes Avenue where a linear park will be located benefiting pedestrian circulation. This specific circulation will be connected to one of Mexico’s biggest BRT system lines, improving not only the built environment but also increasing connectivity at the area of influence. On the other hand, other interventions due to intense traffic congestion at the Interior Circuit, will improve mobility and flow increasing access to public transportation. However the main focus of this project has been centered on facilitating the mobility of private cars, and no additional linkages to alternative modes of transportation have been considered. Traffic analysis are focused on improving flow and improving the average speed of the Interior Circuit, nonetheless the project is mainly based on the existing circulation related to private cars. The evaluation presented mentioned that public transport would be promoted on the side lanes, however the information about these arrangements have not been found.</p> <p><i>Source: Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales, Dirección de Construcción de Proyectos Especiales “A”. Evaluación Socioeconómica, Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México. (Ciudad de México, 2013).</i></p> <p><u>RECOMMENDATIONS</u></p> <p><i>Given that the project is focused on access and mobility, it is recommended to take into consideration how alternative modes of transportation could be promoted. Each intersection presents specific and unique transit conditions, and it is suggested to locate and evaluate different degrees of convenience and accessibility to transport facilities. In addition, it is recommended to present drawings that show bicycle and pedestrian walkways and specifications for upgrading the use of existing transit infrastructure.</i></p>
<p>QL2.6 Improve Site Accessibility, Safety & Wayfinding</p>	<p>3</p>	<p>Enhanced</p> <p>The project includes improvement of both horizontal and vertical signaling for facilitating mobility, safety and access. In this matter, the project follows specific laws and regulations that are supervised by relevant authorities. If these protocols are not followed they will be sanctioned and suspended. According to the third point on the Administrative Resolution, strategic access to work areas will be designed for not affecting transit and to avoiding any possible accidents derived from heavy machinery movement. The project area will contain preventive, informative and restrictive signaling for for not altering the structural behavior of the construction site and its adjacencies. In legal terms, the Director of the Construction Work (DRO) will be in charge of establishing and supervising these regulations and they will be applied to all the interventions along the Interior Circuit. During construction, the Federal District Secretary of Transport and Mobility will coordinate a special detour program. This program will support the transit system so as to minimize the effect of the construction. These protocols will apply to all the intersections identified.</p>

		<p><i>Source: Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Plutarco E. Calles.(Ciudad de México, 2013). 23</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Molinos.(Ciudad de México, 2013). 22</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tezontle.(Ciudad de México, 2013). 25</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tlalpan.(Ciudad de México, 2013). 20</i></p> <p>RECOMMENDATIONS</p> <p><i>It is recommended to submit documents showing plans for access and egress and plans for signage showing how the project area will be structured. Since law requires these regulations, it is recommended to present the documents showing effectiveness of accessibility and protection. Also include such documentation on how the project will impact and improve public safety and security.</i></p>
<p>QL3.1 Preserve Historic and Cultural Resources</p>	<p>0</p>	<p>No score</p> <p>There was no information submitted to evaluate this credit. Drawings, design documents and specific information about this aspect have not been found. The project is located in an urban area and it does not state the existence of any historical or cultural resources. Documentation about meetings with historic/cultural stakeholders have not been identified.</p> <p><i>Source:</i></p> <p>RECOMMENDATIONS</p> <p><i>It is recommended to evaluate area of influence of this project to verify any possible connection to a historical or cultural site.</i></p>
<p>QL3.2 Preserve Views and Local Character</p>	<p>6</p>	<p>Superior</p> <p>The proposed interventions along Mexico’s City Interior Circuit are intended to reduce traffic flow and enhance the speed on the highway. Given that the project is located in an urban area, alternatives have been specified for the following intersections: Molinos – Revolución, Circuito Interior – Insurgentes Sur, Circuito Interior – Plutarco Elías Calles, Circuito Interior – Ote 106 Avenue and Circuito Interior – Tezontle Avenue. The project aligns to community needs by identifying three main problems: a) Intersections with traffic lights b) Intersections with English turn (left turn) and c) Coalescence of multiple streets (traffic inputs and outputs). Bridges, tunnels and red light modifications have been situated throughout 16.5 km of the Interior Circuit. Studies have shown that the urban identity, character and local views will be mostly preserved. The area is already intervened by a main highway system and the operations do not incur severe damage to the urban context. The trees that will be removed from the area and wil be replanted along the new green and public spaces that have been planned. Within the aforementioned interventions, the most relevant and impactful is the one located at Insurgentes Avenue. At this site the project proposes the integration of a roundabout and a linear park that will address and enhance the local character of the community.</p> <p><i>Source: Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales, Dirección de Construcción de Proyectos Especiales “A”. Evaluación Socioeconómica, Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México. (Ciudad de México, 2013).</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Plutarco E. Calles.(Ciudad de México, 2013).</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Molinos.(Ciudad de México, 2013).</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución</i></p>

		<p><i>Administrativa Tezontle.(Ciudad de México, 2013). Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tlalpan.(Ciudad de México, 2013).</i></p> <p><u>RECOMMENDATIONS</u></p> <p><i>It is recommended to develop plans and drawings that report the important elements of the site character for evaluating proposed transformations. Also, document existing policies and regulations regarding public views, identification of protected areas, local character and urban context.</i></p>
<p>QL3.3 Enhance Public Space</p>	<p>6</p>	<p>Superior</p> <p>The improvement of Mexico’s City Interior Circuit includes a series of interventions that directly affect public space by facilitating vehicle mobility. The project includes the creation of green areas, walkways, pedestrian bridges and public space. Within this initiative the project attempts to not only improve the quality, access and mobility throughout the highway, but also to recuperate impacts and create new recreational areas. The project includes four interventions across the Interior Circuit: Molinos – Revolución, Circuito Interior – Insurgentes Sur, Circuito Interior – Plutarco Elías Calles, Circuito Interior – Ote 106 Avenue and Circuito Interior – Tezontle Avenue. Within these proposals, the major focus has been to allow and facilitate private vehicular traffic flow. However, at the intersection within Circuito Interior and Insurgentes Avenue, due to the integration of a tunnel, the street will incorporate a linear park and a roundabout. This specific site creates a new public space that is linked to Insurgentes Avenue, one of the most important avenues in Mexico City. This project is aligned not only to private vehicles, but it includes pedestrian circulation and connection to Metrobus Line 1 (Mexico’s City BRT System). This intervention will connect the area and will have a positive impact on the neighborhood and adjacent communities. The linear park has been developed in collaboration with the Public Space Authority but detailed information has not been submitted.</p> <p><u>Source:</u> <i>Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales, Dirección de Construcción de Proyectos Especiales “A”. Evaluación Socioeconómica, Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México. (Ciudad de México, 2013). Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tlalpan.(Ciudad de México, 2013). Grupo Sacmag. Estudio de Impacto Vial, Paso Deprimido Vehicular, Av. Insurgentes y Av. Rio Mixcoac (Circuito Bicentenario) – Moras – Hestia. (México, Distrito Federal, 2013).Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Areas Verdes para el Proyecto Distribuidor Vial Tlalpan” (Ciudad de México, 2014). Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Areas Verdes del Proyecto Puente Vial Plutarco Elías Calles” (Ciudad de México, 2014). Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Areas Verdes del Proyecto Puente Vehicular Tezontle” (Ciudad de México, 2014).</i></p> <p><u>RECOMMENDATIONS</u></p> <p><i>It is recommended to submit documentation and agreements made with the Public Space Authority in order to evaluate the potential impacts and benefits of the project. Drawings, plans and other documentation regarding the overall public space plan is required for this section. It is suggested to also submit letters, memoranda and minutes of meetings with stakeholders showing satisfaction of the project.</i></p>

QL0.0 Innovate Or Exceed Credit Requirements	
	48

SUB CATEGORY:LEADERSHIP		
	Score	Urban Improvement and Integral Maintenance of the Interior Circuit, Mexico.
LD1.1 Provide Effective Leadership And Commitment	4	Enhanced
		<p>Because the project’s purpose is to reduce traffic congestion and improve the urban conditions at defined intersections of Mexico’s City Interior Circuit, all of the agreements and commitments have been tailored to promote sustainable performance. The project incorporates various agreements between four different enterprises: Gami Ingeniería e Instalaciones, La Peninsular Compañía Constructora, Operadora y Administración Técnica, and Impulsora de Desarrollo Integral. Public commitments are organized between the Public Works Ministry (Secretaría de Obras Públicas), the Environmental Ministry (Secretaría de Medio Ambiente) and the Public Space Authority (Autoridad del Espacio Público). Within these regulations, the project team has demonstrated its commitment to the principles of sustainability established by the project. However, there is a lack of documentation regarding the timeframe within which these agreements will play out. The project scope has not defined the specific conditions and actions taken to address the economic, environmental and social impacts of the project. The project’s role in accomplishing sustainability goals has not been defined.</p> <p><i>Source: Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales. Contrato de Prestación de Servicio a Largo Plazo para el Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México. (Ciudad de México, 2013), 7.</i></p>
		<p><u>RECOMMENDATIONS</u></p> <p><i>Because the project’s purpose is to reduce traffic congestion and improve the urban conditions at defined intersections of Mexico’s City Interior Circuit, all of the agreements and commitments have been tailored to promote sustainable performance. The project incorporates various agreements between four different enterprises: Gami Ingeniería e Instalaciones, La Peninsular Compañía Constructora, Operadora y Administración Técnica, and Impulsora de Desarrollo Integral. Public commitments are organized between the Public Works Ministry (Secretaría de Obras Públicas), the Environmental Ministry (Secretaría de Medio Ambiente) and the Public Space Authority (Autoridad del Espacio Público). Within these regulations, the project team has demonstrated its commitment to the principles of sustainability established by the project. However, there is a lack of documentation regarding the timeframe within which these agreements will play out. The project scope has not defined the specific conditions and actions taken to address the economic, environmental and social impacts of the project. The project’s role in accomplishing sustainability goals has not been defined.</i></p>
LD1.2 Establish A Sustainability Management System	1	<p>Improved</p> <p>The project owner and team assessed and prioritized the environmental, economic and social aspects of the project through a series of studies and evaluations of traffic flows at the defined intersections on Mexico’s City Interior Circuit. The creation of bridges, tunnels and parks will substantially improve mobility and reduce pollution. The project has been mainly focused on providing continuity to one of Mexico’s most important highways and liberating some of the</p>

		<p>most conflicted intersections of the area. The project infrastructure has also located public spaces and a linear park at the intersection with Insurgentes Avenue.</p> <p>Although the project is focused on creating a more sustainable traffic infrastructure, the documents presented do not clearly demonstrated the role of authorities in prioritizing a sustainable future. The project lacks information for evaluating the management system or showing different business processes and management controls that may take place.</p> <p><i>Source: Grupo Sacmag. Estudio de Impacto Vial, Puente Vehicular Revolución Molinos 2a. Etapa. (México, Distrito Federal, 2013).</i></p> <p><i>Grupo Sacmag. Estudio de Impacto Vial, Distribuidor Vial Tlalpan - Churubusco. (México, Distrito Federal, 2013).</i></p> <p><i>Grupo Sacmag. Estudio de Impacto Vial, Paso Deprimido Vehicular, Av. Insurgentes y Av. Rio Mixcoac (Circuito Bicentenario) – Moras – Hestia. (México, Distrito Federal, 2013).</i></p> <p><i>Grupo Sacmag. Estudio de Ingeniería de Transito para los Pasos a Desnivel de Tezontle, Oriente 106 y Eje 4 Sur con el Circuito Bicentenario del Distrito Federal. (México, Distrito Federal, 2013).</i></p> <p>RECOMMENDATIONS</p> <p><i>Provide more information about the management structures and organizational aspects showing the project’s responsibility to promote and integrate sustainable practices. Document any process, business model, or any other potential structure that will allow the project’s scope, scale and complexity to improve its sustainable performance.</i></p>
<p>LD1.3 Foster Collaboration And Teamwork</p>	<p>1</p>	<p>Improved</p> <p>The project goals include the creation of a more sustainable community and infrastructure. The project is embedded within multiple agencies and stakeholders, however its approach has not addressed the importance of a systematic and comprehensive approach for optimizing infrastructure performance. The project has established collaboration between different enterprises, stakeholders, and specialists and have incorporated them into the design proposal. Nonetheless, the methodology and structure for better collaboration principles have not been clearly established or planned. The process and extent of collaboration within the project team does not present any information on multidisciplinary processes or opportunities for improving sustainable performance while avoiding design conflicts. Documents about risk and rewards sharing terms have not been submitted.</p> <p><i>Source: Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales. Contrato de Prestación de Servicio a Largo Plazo para el Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México. (Ciudad de México, 2013).</i></p> <p>RECOMMENDATIONS</p> <p><i>Include evidence and design considerations for planning systematic processes for optimizing the project’s performance. Design specific methodologies and work sessions for identifying and improving sustainable performance. Present evidence of to what extent the project team shares risks and rewards.</i></p>
<p>LD1.4 Provide For Stakeholder Involvement</p>	<p>1</p>	<p>Improved</p> <p>Very little information has been submitted regarding this credit. Stakeholder participation appears to be incorporated through basic exchange of information. The stakeholder input into decision-making plans seems limited to the constraints of the urban environment and to the information provided by the traffic studies. The project is divided in two phases, both of them asses the rehabilitation of existing infrastructure and incorporates the new interventions to the Interior Circuit. During each of the phases the contract specifies different stakeholder scopes and responsibilities. However, the documents presented does not show to what extent the project team assessed the various issues and information exchanged in order to create a platform for engagement.</p>

		<p><i>Source: Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales. Contrato de Prestación de Servicio a Largo Plazo para el Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México. (Ciudad de México, 2013).</i></p> <p><i>Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales. Convenio Modificatorio al Contrato Administrativo para la Prestación de Servicio a Largo Plazo para el Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México. (Ciudad de México, 2013).</i></p> <p><i>Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales. Anexo 2.1, Contrato de Prestación de Servicio a Largo Plazo para el Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México. (Ciudad de México, 2013).</i></p> <p>RECOMMENDATIONS</p> <p><i>Provide a list of stakeholder groups and minutes of meetings with different stakeholder groups. Consider policies and business practices that ensure fair and equitable discussion with various stakeholders. Program and plan stakeholder involvement.</i></p>
LD2.1 Pursue By-Product Synergy Opportunities	0	<p>No Score</p> <p>The project has not specified the use of nearby by-products or discarded materials from nearby operations. However, it has specified the allocation of its own by-products and materials to specific locations in Mexico City.</p> <p><i>Source: N/A</i></p> <p>RECOMMENDATIONS</p> <p><i>Include or develop a study that identifies potential nearby by-product facilities and waste streams that could be integrated into the project. Take opportunities to use recycled materials either at design, construction or operation phases. Make contact with facility decision-makers in order to assess the potential. Document all types of synergy opportunities and applications.</i></p>
LD2.2 Improve Infrastructure Integration	7	<p>Superior</p> <p>The project’s objective of reducing traffic congestion at the Interior Circuit is aligned to specific interventions at the street level, providing better connectivity and improving the existing infrastructure. Alternatives have been specified for the following intersections: Molinos – Revolución, Circuito Interior – Insurgentes Sur, Circuito Interior – Plutarco Elías Calles, Circuito Interior – Ote 106 Avenue and Circuito Interior – Tezontle Avenue. Bridges, tunnels, and red light modifications have been situated throughout 16.5 km of the Interior Circuit. The selected intersections improved the socio-economic conditions of the community by ameliorating the urban identity and facilitating access, flow and circulation around such areas. Additional investments have been planned in order to integrate public and green space by way of a lineal park at the intersection of Insurgentes avenue. This specific location has been articulated to the rapid transit system metrobus, facilitating both transit and pedestrian mobility. Pedestrian bridges will also be integrated in different areas in order to enhance pedestrian flow and community connectivity.</p> <p><i>Source: Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales, Dirección de Construcción de Proyectos Especiales “A”. Evaluación Socioeconómica, Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México. (Ciudad de México, 2013).</i></p> <p>RECOMMENDATIONS</p> <p><i>Provide more materials and evidence about the integration of community infrastructure elements in order to increase the degree of environmental, economic and social optimization. The project could also incorporate and take advantage of valuable community assets, including local knowledge and social capital.</i></p>
LD3.1 Plan For	1	Improved

<p>Long-Term Monitoring & Maintenance</p>		<p>The project team has considered a plan for long-term monitoring and maintenance. Considering the estimated project’s life span is 32 years (2 years of construction and 30 years of operation) investment has been estimated at 120 million pesos per year (\$886,103 USD). The maintenance plan includes pavement, signaling, cleaning, lighting, green areas and pedestrian bridges among others. This actions are acknowledged in the Socioeconomic Evaluation and will be implemented across the different sites of the Interior Circuit in order to expand its useful life. Most of the budgeting will be designated to the maintenance of green areas and parks (37.1 million pesos or \$2.8 million USD) while the rest will spent on sidewalks (10 million pesos or \$738,500 USD), garbage collection (5.2 million pesos or \$383,900 USD), monitoring stations (7.2 million pesos or \$531,661 USD) and pavement with and without hydraulic concrete (15.4 million pesos or \$1.14 million USD). It is assumed that these expenditures will help to optimize the conditions of the project during the years of operation. Although maintenance and monitoring has been considered in this project, the allocation of resources does not in itself reveal a plan for ensuring and enhancing sustainability measures that can be followed through the life of the project.</p> <p><i>Source: Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales, Dirección de Construcción de Proyectos Especiales “A”. Evaluación Socioeconómica, Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México. (Ciudad de México, 2013), 62.</i></p> <p>RECOMMENDATIONS</p> <p><i>It is important to establish plans and resources for long-term monitoring and maintenance. Present more information regarding long-term monitoring and maintenance. Present documentation regarding the designation and organization of the assigned monitors of the constructed work. Elaborate a plan for ensuring that ecological protection, mitigation and enhancement measures are incorporated into the project and that such can be followed through. It is recommended to ensure that the design performance will be maintained throughout the design life of the project.</i></p>
<p>LD3.2 Address Conflicting Regulations & Policies</p>	<p>0</p>	<p>No score</p> <p>No documentation has been found for this credit.</p> <p><i>Source: N/A</i></p> <p>RECOMMENDATIONS</p> <p><i>Sometimes laws and regulations are obsolete in relation to current needs, therefore it is recommended to identify the scope and extent of assessment of the possible negative impacts from conflicting regulations and policies. Specify the extent to which the project team works with regulations to mitigate the negative effects. Provide evidence of activities to identify applicable laws, standards and regulations that appear to be unintentionally running counter to sustainability goals, objectives and practices.</i></p>
<p>LD3.3 Extend Useful Life</p>	<p>1</p>	<p>Improved.</p> <p>The Interior Circuit is one of Mexico City’s main highways; 42 km were designed as an interior ring for containing the first urban boundary of the city. It was constructed in 1961 and finalized in 1976 during the administration of Ernesto P. Uruchurtu. The proposed interventions are located across four intersections in the southeast part of the highway. The project is inherently extending the useful life of the Interior Circuit. It incorporates considerations for expanding and creating a more efficient use of the existing infrastructure with a time-horizon of 30 years. In addition to the specific interventions, the avenue’s concrete has been replaced in order to extend its life cycle. The project includes the design of the public space and parks. The project’s urban elements are intended to add durability, flexibility and resilience throughout the useful life of the project. Additional to the construction of the proposed interventions, in order to expand the useful life of the project,</p>

		<p>the Socio Economic Evaluation has considered a maintenance plan that accounts for \$120 million pesos per year (\$886,103 USD). The maintenance plan includes pavement, signaling, cleaning, lightning, green areas and pedestrian bridges, among others.</p> <p><i>Source: Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales, Dirección de Construcción de Proyectos Especiales "A". Evaluación Socioeconómica, Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México. (Ciudad de México, 2013), 62.</i></p> <p>RECOMMENDATIONS</p> <p><i>Document how the elements are intended to add durability, flexibility and resilience through the useful life of the project. This can be done by adding specific considerations about extending the useful life of the project.</i></p>
LD0.0 Innovate Or Exceed Credit Requirements		N/A
	16	

CATEGORY II: CLIMATE AND ENVIRONMENT		
RESOURCE ALLOCATION		
	Score	Urban Improvement and Integral Maintenance of the Interior Circuit, Mexico.
RA1.1 Reduce Net Embodied Energy	0	No Score
		The project's basic material is hydraulic concrete and there has not been any applicable information to analyze this credit.
		<i>Source: N/A</i>
		RECOMMENDATIONS <i>It is recommended to develop a life cycle assessment for estimating the net embodied energy of the project. Life-cycle assessments generally include the understanding and study of the required energy for material extraction, transportation, refinement, manufacture and processes undertaken until the material is ready to be transported to the construction site. The estimation must consider the materials to be used in the project's construction as well as the materials to be used for maintenance and operation during the project's life. It is also recommended to specify how the project owner and team has incorporated such criteria into the design and to what extend this goal has been efficiently pursued.</i>
RA1.2 Support Sustainable Procurement Practices	2	Improved The interventions proposed (in Molinos – Revolución, Circuito Interior – Insurgentes Sur, Circuito Interior – Plutarco Elías Calles, Circuito Interior – Ote 106 Avenue and Circuito Interior – Tezontle Avenue) have been developed according to sustainable practices determined by the Administrative Resolution and Environmental Impact Analysis of each area. These guidelines establish general material sustainability procedures in different topics such as waste, water and energy. All of the actions have been authorized by the Environment Secretary and follow the regulations established by the different regulations in Mexico. For example, for each site Article I.12 considers the technical parameters of the NADF-007.RNAT-2004 where it specifies that at least 25% of the materials should be recycled content. It also specifies that all waste coming from the excavation should be used in place of organic soil. However, the measures and regulations found in the Administrative Resolution do not show procedures and policies of sustainable practices related to material selection.

		<p><i>Source: Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Plutarco E. Calles.(Ciudad de México, 2013).</i></p> <p><i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Molinos.(Ciudad de México, 2013).</i></p> <p><i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tezontle.(Ciudad de México, 2013).</i></p> <p><i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tlalpan.(Ciudad de México, 2013).</i></p> <p>RECOMMENDATIONS</p> <p><i>Provide detailed information and specify materials and equipment that come from suppliers who implement sustainable practices. It is encouraged to consider materials which protect human health and the environment, contain recycled content, and do not use hazardous or toxic materials. Specify to what extent the project team has procured materials that are withdrawn from sustainable sources. Include certifications from purchased materials and suppliers from standard or third-party accreditations. An inventory of all the materials and criteria selection should be submitted in order to fully evaluate this credit. Any material coming from a sustainable source or from an environmentally responsibly supplier will enhance the project.</i></p>
<p>RA1.3 Used Recycled Materials</p>	<p>2</p>	<p>Improved</p> <p>The project incorporates and uses the existing structure of the Interior Circuit in order to create and enhance all the proposed interventions. According to the Administrative Resolution each site has considered the technical parameters of the NADF-007.RNAT-2004 regulation where it specifies that at least 25% of the materials should be replaced by recycled ones. This can be found at each of the interventions proposed across the Interior Circuit - Molinos- Revolución, Insurgentes Sur, Plutarco Elias Calles, Ote. 106 Avenue and Tezontle Avenue. The guidelines have been established according to the Ministry of Environment (Secretaria de Medio Ambiente) under their Environmental Impact Analysis. The interventions have been authorized and they operate according to the specified regulations; however, detailed information about the use of materials and other specific content has not been submitted or registered. The project lacks documentation regarding the exact amount of recycled and reclaimed materials.</p> <p><i>Source: Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Plutarco E. Calles.(Ciudad de México, 2013).</i></p> <p><i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Molinos.(Ciudad de México, 2013).</i></p> <p><i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tezontle.(Ciudad de México, 2013).</i></p> <p><i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tlalpan.(Ciudad de México, 2013).</i></p> <p>RECOMMENDATIONS</p> <p><i>As the purpose of this credit is to reduce the use of virgin materials and avoid sending useful materials to landfills, it is recommended to create and submit an inventory of existing materials and structures that might have reuse potential. Additionally, the documentation showing the location and weight or volume of reused structures or materials should be elaborated. It is suggested to calculate the percentage of total project materials by weight or volume that will or can be reused or recycled.</i></p>
<p>RA1.4 Use</p>	<p>0</p>	<p>No score</p> <p>No information has been provided according to this credit.</p>

<p>Regional Materials</p>		<p><i>Source: N/A</i></p> <p><u>RECOMMENDATIONS</u></p> <p><i>Include and specify to what extent has the project team locally sourced materials, plants, aggregates and soils. Submit the inventory of materials from around 80 Kilometers (50 miles). This serves for minimize transportation costs and impacts and retain regional benefits through specifying local sources. Calculate the percentage of the project materials that can be sourced locally or within a 800 Kilometers (500 miles) radius.</i></p>
<p>RA1.5 Divert Waste From Landfills</p>	<p>3</p>	<p>Improved</p> <p>According to the Administrative Resolution, the organic materials produced from the excavation should be incorporated into the project’s green spaces or into green spaces in proximity. The project located at the intersection of the Interior Circuit and Insurgentes Avenue presents the most extensive waste generation due to the creation of a tunnel. Only 1,724.10 of 17, 241 cubic meters of the excavation by-products will be reused, while 15,516.9 cubic meters will be recycled at industrial waste treatment enterprises. The Administrative Resolution stipulates that evidence for the correct use of resources and by-products must be indicated on the project’s PMRS. However, this document has not been found so it is impossible to evaluate it. Moreover, considering the technical parameters of NAF-007-RNAT-2004, recycled materials could replace 25% of materials if they accomplish the technical specificities. Although the project presents some guidelines for reducing waste and improves performance, the strategy is not presented within a complete assessment and identification of potential synergies with nearby facilities. The project lacks a study that reveals possible accommodations and potential integration with nearby by-products.</p> <p><i>Source: Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Plutarco E. Calles.(Ciudad de México, 2013). Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Molinos.(Ciudad de México, 2013). Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tezontle.(Ciudad de México, 2013). Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tlalpan.(Ciudad de México, 2013).</i></p> <p><u>RECOMMENDATIONS</u></p> <p><i>It is recommended to create a waste management plan in order to anticipate and reduce waste generation. The strategies located on the plan must reduce waste generation and maximize waste reuse or recycling. Develop an inventory of the project waste streams in relationship to the material inventory. It is suggested that this should also include potential sites for acceptable reuse and recycling. Elaborate calculations as the ratio of material diverted from landfills against the total waste generated during construction and operation. Because the intervention at Insurgentes Avenue generates the most waste, it is recommended to develop a more detailed plan of waste management for this area.</i></p>
<p>RA1.6 Reduce Excavated Materials Taken Off Site</p>	<p>2</p>	<p>Improved</p> <p>According to Administrative Resolution, the organic materials coming from the excavation are supposed to be incorporated into the project’s green spaces or into green spaces in proximity. However, it has not been specified whether the soil generated will actually be reused. According to the regulations, the project must identify and maximize the opportunities to minimize waste quantities. Any of the interventions across the Interior Circuit have specified how the project will balance or reduce the excavated material taken off-site. The documentation submitted does not includes any plan for reusing or recycling materials across the sites. The only protocols that have been found are specified under the Administrative</p>

		<p>Resolution of each site. Such regulations operate under the approval and evaluation of the Environmental Ministry (Secretaria de Medio Ambiente).</p> <p><i>Source: Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Plutarco E. Calles.(Ciudad de México, 2013).</i></p> <p><i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Molinos.(Ciudad de México, 2013).</i></p> <p><i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tezontle.(Ciudad de México, 2013).</i></p> <p><i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tlalpan.(Ciudad de México, 2013).</i></p> <p><u>RECOMMENDATIONS</u></p> <p><i>It is recommended to create and present documentation estimating the excavated materials that will be taken off site. Present and develop metrics of excavated materials that will be retained on site. Specifically, this applies to the tunnel located at Insurgentes Avenue, since it is the one that required the most soil movement. It is suggested to show how the project will reuse, recycle and reduce the movement of soils and excavated materials in order to minimize transportation and environmental impacts.</i></p>
<p>RA1.7 Provide for Deconstruction & Recycling</p>	<p>0</p>	<p>No Score.</p> <p>The project has not submitted documents that prove this practice. No long-term material analysis has been found.</p> <p><u>Source:</u></p> <p><u>RECOMMENDATIONS</u></p> <p><i>It is important to consider that when the structure reaches the end of its useful life, the components can be easily dismantled. It is recommended to consider future recycling, up-cycling and reuse in order to facilitate the project’s disassembly or deconstruction at the end of its useful life. Also, determine and calculate the general percentage of materials by cost or weight that likely will be recycled at the end of their life. This will serve for planning and managing opportunities for future recycling.</i></p>
<p>RA2.1 Reduce Energy Consumption</p>	<p>3</p>	<p>Improved</p> <p>The project has taken into consideration the use of renewable energy. As stated in the Administrative Resolution on the Energy Clause I.24, photovoltaic cells should be used for taking advantage of solar energy across the Interior Circuit. Additionally, according to the aforementioned regulations energy-saving lighting will be included throughout the project. Maintenance and energy monitoring performance will be developed throughout the project’s operation. The project’s lighting performance operates upon the aforementioned regulations, however there has not been more information that specifies the use of renewable energy during the construction phase. The project evaluations does not certify the amount of renewable energy that would be needed in order to meet the energy requirements of the project.</p> <p><u>Source: Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Plutarco E. Calles.(Ciudad de México, 2013).</u></p> <p><u>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Molinos.(Ciudad de México, 2013).</u></p> <p><u>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tezontle.(Ciudad de México, 2013).</u></p> <p><u>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tlalpan.(Ciudad de México, 2013).</u></p> <p><u>RECOMMENDATIONS</u></p>

		<p>Specify the energy needs of the project in order to analyze the amount of renewable energy resources that could be incorporated into the design, construction and operation phases. Present documents that show the project's anticipated operational energy consumption. Identify and analyze opportunities for reducing energy consumption in the operation and maintenance of constructed works. Develop an inventory of energy saving methods considered and their respective feasibility studies.</p>
RA2.2 Use Renewable Energy	0	<p>No score</p> <p>The project embraces a considerable amount of renewable energy use, taking advantage of Mexico's solar energy catchment opportunity. As stated in the Administrative Resolution, photovoltaic cells will be utilized to maximize the use of solar energy across the Interior Circuit. However, the project's technical specifications and reduced energy consumption rates have not been found in available documentation.</p> <p><i>Source: Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Plutarco E. Calles.(Ciudad de México, 2013).</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Molinos.(Ciudad de México, 2013).</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tezontle.(Ciudad de México, 2013).</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tlalpan.(Ciudad de México, 2013).</i></p>
		<p><u>RECOMMENDATIONS</u></p> <p>Present and develop specific documentation that establishes an anticipated annual output of renewable sources and overall percentage of renewable energy. The project has claimed the use of photovoltaic cells, however in order to understand its impact, evaluations about the total energy consumption rates should be established. This specific item could develop certain parameters for stating the advantages and savings related to the use of renewable energy.</p>
RA 2.3 Commission & Monitor Energy Systems	0	<p>No score.</p> <p>According to Article 123 of the LAPDF, performance monitoring will be developed through the operation phase. The project's maintenance plan does includes a monitoring system. However, it is not indicated whether the monitoring systems will include energy systems and their efficiency.</p>
		<p><i>Source: N/A</i></p>
		<p><u>RECOMMENDATIONS</u></p> <p>Determine whether the monitoring system includes energy performance analysis through the lifespan of the project. Create documents and specifications showing the location, purpose and type of monitoring equipment installed. Identify to what extent the introduction of advanced monitoring systems will enable more efficient energy operations.</p>
RA3.1 Protect	2	Improved

<p>Fresh Water Availability</p>	<p>This factor is of major importance due to the water scarcity and environmental fragility of Mexico City. As stated in the Administrative Resolution's Water Clause I.23 it is prohibited to spill potable, phreatic or residual water without the previous separation of solid waste. According to Article 23 of the LAPTDF it is prohibited to generate disturbances to the environment. In relationship to the damage to groundwater, Article 114 of the LAPTDF specifies that the project team is obliged to replace and renew the water resources if they are affected. As specified in the Landscape Project there exist (among others) four groundwater bodies located at Mixcoac, Churubusco, Consulado and La Piedad. The watershed in which the project is located constitutes a major source of freshwater for Benito Juárez Municipality (Delegación). Specifically, one of the project intersections at Rio Churubusco forms part of the basic drainage and sewage infrastructure, connected to the General Drainage System of the Valley of Mexico. In this sense, as the project does not directly interfere with this system, the project is not affecting water availability. However, detailed information about freshwater availability and other water management aspects have not been identified within the environmental assessment of the project. It is required to report on water resource demands and opportunities in order to asses this credit.</p> <p><i>Source: Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Plutarco E. Calles.(Ciudad de México, 2013), 20.</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Molinos.(Ciudad de México, 2013).</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tezontle.(Ciudad de México, 2013).</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tlalpan.(Ciudad de México, 2013).</i> <i>Espacios Verdes Integrales SA de CV, "Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes para el Proyecto Distribuidor Vial Tlalpan" (Ciudad de México, 2014), 13.</i> <i>Espacios Verdes Integrales SA de CV, "Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes del Proyecto Puente Vial Plutarco Elías Calles" (Ciudad de México, 2014)</i> <i>Espacios Verdes Integrales SA de CV, "Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes del Proyecto Puente Vehicular Tezontle" (Ciudad de México, 2014)</i></p> <p>RECOMMENDATIONS</p> <p><i>Document how this project assesses and addresses the water issue. Develop a water availability assessment in order to identify the location, type, quantity, rate of recharge and quality of water resources. Estimate the average peak demands and long term needs. Report on the long term availability and replenishment or recharge of fresh water supply. Identify the opportunities for water reuse or groundwater recharge on site. Plan the discharge sites and their impacts, including water quality and quantity.</i></p>
<p>RA3.2 Reduce Potable Water Consumption</p>	<p>17 Conserving</p> <p>According to the Landscape Project Specifications, all the gardening and irrigation is done with recycled water. The use of potable water has been prohibited in this project in its totality and it will be replaced with the use of residual water or rainwater harvesting. The irrigation of the vegetated surfaces will take place 3 days a week while the vegetation is growing. Once the vegetation has emerged, irrigation will take place once a week related to the season of the year. The project team has provided documentation and evidence about the distribution and employment of recycled water through the construction phase and irrigation for vegetated surfaces. All of these actions are supported by the Ministry of Environment and stated in the</p>

		<p>Administrative Resolution in the Water Topic Clause II.3, where it is indicated that all water use must be done with recycled or treated water.</p> <p><i>Source: Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Plutarco E. Calles.(Ciudad de México, 2013), 20.</i></p> <p><i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Molinos.(Ciudad de México, 2013).</i></p> <p><i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tezontle.(Ciudad de México, 2013), 28.</i></p> <p><i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tlalpan.(Ciudad de México, 2013).</i></p> <p><i>Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes para el Proyecto Distribuidor Vial Tlalpan” (Ciudad de México, 2014), 13.</i></p> <p><i>Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes del Proyecto Puente Vial Plutarco Elías Calles” (Ciudad de México, 2014)</i></p> <p><i>Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes del Proyecto Puente Vehicular Tezontle” (Ciudad de México, 2014)</i></p> <p>RECOMMENDATIONS</p> <p><i>Specify to what extent the owner and project team have reduced potable water consumption. Provide any documentation for supporting the use of non-potable water, recycled greywater and stormwater. Include a feasibility and cost analysis cost in order to take measures for reducing potable water consumption during construction and operation.</i></p>
RA3.3 Monitor Water Systems	0	<p>No score</p> <p>The city’s regulations have included certain norms related to water use and consumption. No documentation was provided for how the project’s team monitoring system is facing these challenges.</p> <p><i>Source: N/A</i></p> <p>RECOMMENDATIONS</p> <p><i>Document and commission water monitoring systems. The monitoring authority should be separate from the construction team and should identify the efforts that have been made in this category. These systems will ensure and promote more efficient operations, helping both overall costs and the environment. Provide any information related to this category in order to have a standard for evaluation.</i></p>
RA 0.0 Innovate Or Exceed Credit Requirements		N/A
	31	

NATURAL WORLD		
	Score	Urban Improvement and Integral Maintenance of the Interior Circuit, Mexico.
NW1.1 Preserve Prime Habitat	9	<p>Superior</p> <p>The urban improvement of the Interior Circuit avoids development on prime habitats due to its location at the heart of an urbanized area. The Interior Circuit is one of Mexico City’s main highways; 42 km were designed as an interior ring for containing the first urban quadrant of the city. It was constructed in 1961 and finalized in 1976 during the administration of Ernesto P. Uruchurtu. The road traverses through 8 districts and some of the most important avenues such as Insurgentes, Paseo de la Reforma, Río San Joaquín, Tlalpan, Oceanía, Zaragoza and Viaducto. As the project includes the amelioration of an already existing infrastructure located in an urbanized area; the specific interventions located along the Interior Circuit do not affect any natural habitat. One of the most important aspects is that the project improves the connectivity of the area and does not alter natural spaces. While enhancing urban connectivity it promotes a better quality of life that does not alter any natural environment. In the case of the existing vegetation, the species are replanted or transplanted. According to the Administrative Resolution and Article 119 of the LAPTDF fraction 62 III, 67 II, 68 and 88 of the RIAR, the removal, replacement and transplanting of trees is authorized and regulated by the Ministry of Environment. In this case, 870 species will be removed, while 2433 will be replanted and 71 will be transplanted. From the aforementioned interventions, the one located at Tezontle Avenue represents the largest extent of habitat improvement; 422 species are removed while 1201 are replanted and 23 transplanted. However, no more information about the species was found.</p> <p><i>Source: Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales, Dirección de Construcción de Proyectos Especiales “A”. Evaluación Socioeconómica, Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México. (Ciudad de México, 2013). Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Plutarco E. Calles.(Ciudad de México, 2013), 18. Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Molinos.(Ciudad de México, 2013), 15. Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tezontle.(Ciudad de México, 2013), 20. Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tlalpan.(Ciudad de México, 2013), 16.</i></p> <p>RECOMMENDATIONS</p> <p><i>Present more documentation demonstrating that no areas of prime habitat are located on-site or within specified distance of the areas of intervention. Present more detailed information about the species that will be removed and replanted, as well as about a monitoring system for certifying that these actions are taking place correctly.</i></p>
	0	<p>No score</p> <p>The integral improvement of the Interior Circuit avoids development on wetlands and surface water bodies due to its location at the heart of an urbanized area. The area of intervention does not traverse any wetland or water body.</p> <p><i>Source: N/A</i></p> <p>RECOMMENDATIONS</p> <p><i>N/A</i></p>
	NW1.2 Preserve Wetlands and Surface Water	

<p>NW1.3 Preserve Prime Farmland</p>	<p>12</p>	<p>Conserving</p>
		<p>As the project includes the amelioration of an already existing infrastructure located in an urbanized area, the specific interventions located along the Interior Circuit avoid development on prime farmland. The Interior Circuit is one of Mexico City’s main highways; 42 km were design as an interior ring for containing the first urban quadrant of the city. The road traverses through 8 districts and some of the most important avenues such as Insurgentes, Paseo de la Reforma, Río San Joaquín, Tlalpan, Oceanía, Zaragoza and Viaducto. None of the areas contain any soil that has been designated as prime farmland, as all of the intersections are located inside the city. Land use documents show that the areas of intervention have been demarcated as 100% Urban Zone in Mexico’s City Zoning Code.</p>
		<p><i>Source: Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Plutarco E. Calles.(Ciudad de México, 2013), 18.</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Molinos.(Ciudad de México, 2013), 15.</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tezontle.(Ciudad de México, 2013), 20.</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tlalpan.(Ciudad de México, 2013), 16.</i></p>
<p>NW1.4 Avoid Adverse Geology</p>	<p>1</p>	<p>Improved</p>
		<p>The project team identified and delineated earthquake faults and adverse geology. According to the Risk Analysis for the Improvement of the Mexico City Interior Circuit, Mexico City is subject to geologic risk due to the presence of the Pacific Ring Fire Belt and the Neovolcanic Axis. The geologic risks detected are seismic, volcanic, cracking and subsidence. In general, the design of the structural components of the different interventions along the Interior Circuit have been subject to regulations and have been considered through the risk analysis presented. However, as the project allocates certain interventions to an already built infrastructure, the geologic risks that the Interior Circuit faces is related to the larger seismic risk that the city faces. The different interventions have been analyzed in relationship to the seismic area in which they are located. The different areas have been analyzed as follows: Puente Molinos Revolución and Paso deprimido Río Mixcoac Insurgentes (Seismic Zone F), Distribuidor Vial Tlalpan (Seismic Zone G), Puente Tezontle and Río Churubusco (Seismic Zone H1 y H2), Puente Av. Plutarco Elías Calles y Río Churubusco (Seismic Zone H2) and Adecuación Calle Oriente 106 (Seismic Zone H2). However, no more information or risk reduction plans have been submitted. Geological surveys present that clay soils are predominant, while the western part is its composition is based in sandy soils.</p>
		<p><i>Source: Murguía Consultores, “Estudio de Riesgos para operadora y mantenedora del Circuito Interior, S. A de C. V. Por las Obras de Mejoramiento Urbano y Mantenimiento Integral del Circuito Interior de la Ciudad de México” (Ciudad de México, 2014), 36.</i></p>
		<p><u>RECOMMENDATIONS</u></p>
		<p><i>Include plans and designs to reduce risk of damage due to external forces.</i></p>

<p>NW1.5 Preserve Floodplain Functions</p>	<p>5</p>	<p>Enhanced</p> <p>As the project includes the amelioration of already existing infrastructure located in an urbanized area, the specific interventions located along the Interior Circuit do not affect floodplain functions. The areas of intervention were previously paved, so it does not affect any permeable surface. In support of this, land use documents present that the areas of intervention have been demarcated as Urban Zone in Mexico’s City Zoning Code, in which no floodplain function has been altered. Additionally, the documents presented do not include evidence that the Interior Circuit Infrastructure is subject to frequent damage by floods.</p> <p><i>Source: Murguía Consultores, “Estudio de Riesgos para operadora y mantenedora del Circuito Interior, S. A de C. V. Por las Obras de Mejoramiento Urbano y Mantenimiento Integral del Circuito Interior de la Ciudad de México” (Ciudad de México, 2014),</i> <i>Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes para el Proyecto Distribuidor Vial Tlalpan” (Ciudad de México, 2014), 13.</i> <i>Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes del Proyecto Puente Vial Plutarco Elías Calles” (Ciudad de México, 2014).</i> <i>Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes del Proyecto Puente Vehicular Tezontle” (Ciudad de México, 2014).</i></p> <p><u>RECOMMENDATIONS</u></p> <p><i>It is recommended to submit documentation showing siting choices relative to floodplains. Although the project does not affect any floodplain function, Mexico City’s water stress should be taken into consideration in these types of interventions. It is also recommended to calculate the amount of floodplain infiltration, impervious surfaces as well as vegetation and soil protection zones. All of these layers will contribute to the assessment of the floodplain impacts within Mexico City.</i></p>
<p>NW1.6 Avoid Unsuitable Development on Steep Slopes</p>	<p>6</p>	<p>Conserving</p> <p>The project is located on an urbanized area that is mostly located over flat land. The selected sites for intervention do not represent any potential hazard related to landslides or erosion. The soil composition is mostly clay and its designation is divided into lacustrine and transition soil. These type of soils do not includes any type of steep slope in this context, as the project does not present such geographic features. Soil studies in the Landscape Proposal show that hillsides have not been identified as part of the area of intervention. The documents state that the project is located mostly over flat land, with a small incline towards the west.</p> <p><i>Source: Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales, Dirección de Construcción de Proyectos Especiales “A”. Evaluación Socioeconómica, Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México. (Ciudad de México, 2013).</i> <i>Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes para el Proyecto Distribuidor Vial Tlalpan” (Ciudad de México, 2014), 13.</i> <i>Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes del Proyecto Puente Vial Plutarco Elías Calles” (Ciudad de México, 2014).</i> <i>Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes del Proyecto Puente Vehicular Tezontle” (Ciudad de México, 2014).</i></p> <p><u>RECOMMENDATIONS</u></p>

<p>NW1.7 Preserve Greenfields</p>	<p>15</p>	<p>Conserving</p> <p>The urban improvement of the Interior Circuit avoids development on greenfield sites due to its location at the heart of an urbanized area. The road traverses through 8 districts and some of the most important avenues such as Insurgentes, Paseo de la Reforma, Río San Joaquín, Tlalpan, Oceanía, Zaragoza and Viaducto. As the project includes the amelioration of an already existing infrastructure located in an urbanized area, the specific interventions along the Interior Circuit does not affect any greenfield or natural site. The project improves existing infrastructure and expands its life cycle by assessing and ameliorating traffic flow at specific locations. The project does not affect any ecological or natural site, since all the interventions are located in an already developed urban area with residential and commercial land uses.</p> <p><i>Source: Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales, Dirección de Construcción de Proyectos Especiales “A”. Evaluación Socioeconómica, Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México. (Ciudad de México, 2013).</i></p> <p><u>RECOMMENDATIONS</u></p>
<p>NW2.1 Manage Stormwater</p>	<p>4</p>	<p>Enhanced</p> <p>The project consists of the improvement and maintenance of the Interior Circuit highway. Alongside the different interventions green areas have been integrated into the project. The green areas serve both to create public space and to support stormwater management through runoff reduction. In this sense, the intersection that does this with the greatest impact is the one located at Insurgentes Avenue, where a linear park will be located above the tunnel. The park, fountain and other green spaces protect and reduce urban heat island issues. All the green spaces include different vegetation types which support the landscape for groundwater management. It is also stated in the Landscape Proposal that these areas will be irrigated either with recycled water or with stormwater harvesting. In this context, green spaces are serving multiple purposes while capturing stormwater. The areas have been designed with consideration of summer precipitation variability. The area receives an average of 240 mm of annual precipitation, accumulating most of it during the rainy season from June to September.</p> <p><i>Source: Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes para el Proyecto Distribuidor Vial Tlalpan” (Ciudad de México, 2014), 13.</i></p> <p><i>Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes del Proyecto Puente Vial Plutarco Elías Calles” (Ciudad de México, 2014).</i></p> <p><i>Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes del Proyecto Puente Vehicular Tezontle” (Ciudad de México, 2014).</i></p> <p><u>RECOMMENDATIONS</u></p> <p><i>The project has taken into consideration stormwater management in the green areas. However, the documents presented do not specify or include a thorough analysis laying out the stormwater potential that these spaces hold. Also, the use of the stormwater has been only specified for irrigation purposes. It is recommended to expand the scope of the project in relationship to stormwater harvesting, since there is potential for developing a broader infrastructure project that supports the landscape proposal. Present documentation regarding the development and research of water storage possibilities as well as cistern storage capacities. This information will inform the design proposal as well as create a more</i></p>

		<i>comprehensive and sustainable approach for the project. The spaces can be used to serve different purposes and they can be designed in a way that contributes to the natural richness of Mexico City.</i>
NW2.2 Reduce Pesticides and Fertilizer Impacts	2	Enhanced
		Because the project includes green areas, fertilizer selection has been considered with preference for organic products. Some of these types of fertilizers are specified in the Landscape Proposal as mulch or compost, which aims is to ameliorate the soil by using products with organic nutrients. This will favor drainage , retention of water, oxygen, minerals and provision of beneficial growth for flora and fauna. The adequate mixing of the substrate improves the long-term structure and allow for healthy root growth, increasing the survival rate of the vegetation. Plants will be directly observed for plague control. It will also serve as a preventive measure before the application of any chemical, as all the preferred options are organic.
		<i>Source: Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes para el Proyecto Distribuidor Vial Tlalpan” (Ciudad de México, 2014), 13.</i> <i>Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes del Proyecto Puente Vial Plutarco Elías Calles” (Ciudad de México, 2014).</i> <i>Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes del Proyecto Puente Vehicular Tezontle” (Ciudad de México, 2014).</i>
		RECOMMENDATIONS <i>Include operational policies for fertilizer and pesticide application. Support this information with plans and drawings showing how runoff controls will be designated and installed. As a landscape proposal has been designed, it is important to underscore the need for documentation that shows the mix of pesticides and fertilizer in the finished project. The proposal only includes detailed information about the vegetated species and a more thorough analysis could be developed in order to identify fertilizer and pesticide control in the entire project.</i>
NW2.3 Prevent Surface and Groundwater Contamination	1	Improve
		Mexico City has 5 canals, which are the Chalco, Apatlaco, General, Nacional and Cuemanco. In reference to groundwater bodies there have been identified 3 which have been cased such as Mixcoac, Churubusco and La Piedad. Others groundwater bodies are Consulado, Los Remedios, Tacubaya, Becerra, Agua de Lobo, Oxaixtla and Zorrillo. Referred to the area of the project the cased river Churubusco constitutes the basic infrastructure for the drainage and sewage system of the area. As the water body has already been altered through the mega hydraulic infrastructure of Mexico’s City, the construction of this project does not affect any type of surface or groundwater body. In respect to water quality, the area does not present major groundwater contamination problems, as the ones that present these challenges are located in another area of the city. Moreover, according to the administrative resolution corresponding to each intersection, it is prohibited to spill potable water or spill phreatic or residual water without previous treatment into the street, strainers or drainage system. It is also prohibited to discharge materials or waste that pollute or obstruct the flow of water body receptors. These rules are regulated by Mexico’s City Ministry of Environment.

	<p><i>Source: Espacios Verdes Integrales SA de CV, "Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes para el Proyecto Distribuidor Vial Tlalpan" (Ciudad de México, 2014), 13.</i></p> <p><i>Espacios Verdes Integrales SA de CV, "Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes del Proyecto Puente Vial Plutarco Elías Calles" (Ciudad de México, 2014).</i></p> <p><i>Espacios Verdes Integrales SA de CV, "Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes del Proyecto Puente Vehicular Tezontle" (Ciudad de México, 2014).</i></p> <p>RECOMMENDATIONS</p> <p><i>Although the hydrology of the area has already been altered, groundwater contamination presents a major challenge to the ecology of Mexico City. This specific credit will be assessed by presenting documentation of hydrogeologic delineation studies, taking into consideration the state and complexity of Mexico City's aquifer. It is recommended to develop spill and leak prevention response plans and other drawings showing the placement of materials storage piles for handling potential runoff. Efforts can be made to reduce the use of hazardous materials and to propose land use control for preventing any type of water contamination.</i></p>
<p>NW3.1 Preserve Species Biodiversity</p>	<p>0 No score</p> <p>No information has been provided according to biodiversity in the area.</p> <p><i>Source: N/A</i></p> <p>RECOMMENDATIONS</p> <p><i>Although the project is located in an urban area, present documentation identifies existing habitats and species. Sometimes transportation corridors can also be part of a larger ecosystem where certain migratory species or endemic species take shelter. It is recommended to include this consideration into the landscape proposal, as the selection of the species and gardening design could be enhanced through the correct identification of the ecological aspects of the region. If applicable, document certain strategies to facilitate wildlife movement and the appropriation of local wildlife.</i></p>
<p>NW 3.2 Control Invasive Species</p>	<p>5 Superior</p> <p>The Landscape Proposal for green areas presents a catalogue in which the plant species have been studied and carefully selected for being adapted to the climatic conditions of Mexico City. For its design criteria elements like orientation, solar exposure, shadow and wind have been taken into consideration. It will be certified that the selected trees are plague and illness free, and they also plan to avoid the use of species whose physical characteristics can affect the survival of other plants. These characteristics are speed of growth, tree height, foliage and root development, which can affect other plants or even pedestrian users due to its proximity to street and sidewalks. These considerations have been set out by the environmental norm NADF-006-RNAT-2012 that establishes the requirements, criteria, and technical specifications to be met by anyone engaged in promoting, improving and maintaining public green areas.</p> <p><i>Source: Espacios Verdes Integrales SA de CV, "Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes para el Proyecto Distribuidor Vial Tlalpan" (Ciudad de México, 2014), 24.</i></p> <p><i>Espacios Verdes Integrales SA de CV, "Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes del Proyecto Puente Vial Plutarco Elías Calles" (Ciudad de México, 2014).</i></p> <p><i>Espacios Verdes Integrales SA de CV, "Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes del Proyecto Puente Vehicular Tezontle" (Ciudad de México, 2014).</i></p>

	<p><u>RECOMMENDATIONS</u></p> <p><i>It is recommended to include in the landscape project a list of invasive species in the region and a map of all invasive species found on or within ¼ mile (1000 m) of the site. Provide further documentation specifying that the species introduced are non-invasive and that there is a landscaping strategy that includes all vegetation species. Along these lines, a landscape management/maintenance plan must also address detection and management strategies for removing any emerging invasive species.</i></p>
<p>NW3.3 Restore Disturbed Soils</p>	<p>8</p> <p>Conserving</p> <p>Several measures are taken in order to avoid any type of soil disturbance at the project sites because according to the Administrative Resolution all disturbed soils must be restored. For example, specific areas will be designated for avoiding the spill of solvents, paints, additives, oils and fuels that could affect the soil. A maintenance program was executed in order to avoid hydrocarbon leaks that could pollute the soil. All tanks containing fuels for emergency plans and fire prevention should be located and monitored in order to avoid possible leaks. All these regulations take place in agreement with the Ministry of the Environment, which is responsible for such regulations.</p> <p><i>Source: Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Plutarco E. Calles.(Ciudad de México, 2013), 26.</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Molinos.(Ciudad de México, 2013).</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tezontle.(Ciudad de México, 2013).</i></p> <p><u>RECOMMENDATIONS</u></p> <p><i>It is recommended to monitor and supervise the construction site in order to avoid any type of contamination to the soil. If necessary, document any soil restoration activity and areas of disturbance. The project team could also document soil reuse and calculate the amount of soil that has been restored. Restoring soils disturbed during construction in areas that will be re-vegetated improves the soil’s ability to support healthy plants, biological communities, water storage and water filtration.</i></p>
<p>NW3.4 Maintain wetland and surface water functions.</p>	<p>3</p> <p>Improved</p> <p>As the project is located in an urban area which is already developed, the project is not altering any of the existing surface water functions. The project area does not include any wetland or surface water bodies. In reference to the project area located at the intersection with Churubusco, the river has already been cased. The water body had already been altered through the construction of a large-scale hydraulic infrastructure project for Mexico City. Therefore, the construction of this project does not affect any surface water function. It is important to consider that the overall hydraulic connection of Mexico City has been greatly transformed in the past and that the project is not affecting the present conditions.</p> <p><i>Source: Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes para el Proyecto Distribuidor Vial Tlalpan” (Ciudad de México, 2014), 24.</i> <i>Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes del Proyecto Puente Vial Plutarco Elías Calles” (Ciudad de México, 2014).</i> <i>Espacios Verdes Integrales SA de CV, “Programa de Arquitectura del Paisaje y de Fomento y Mejoramiento de Áreas Verdes del Proyecto Puente Vehicular Tezontle” (Ciudad de México, 2014).</i></p>

		<p><u>RECOMMENDATIONS</u></p> <p><i>It is important to include a detailed hydrological study underlying the landscape design and structural proposals. Looking at this analysis could serve to identify regional connections with streams, rivers and lakes that may be located outside the area of study. Also, within that analysis, include documentation showing the current sources of waterways and normal flow in order to understand how it could be maintained or enhanced. This has the potential to become a major practice for the transformation of the Interior Circuit into a sustainable infrastructure project.</i></p>
NW 0.0 Innovate Or Exceed Credit Requirements		N/A
	71	

CLIMATE AND RISK		
	Score	Urban Improvement and Integral Maintenance of the Interior Circuit, Mexico.
CR1.1 Reduce Greenhouse Gas Emissions	0	<p>No score</p> <p>The project aim is to improve traffic flow, connectivity and performance of the highway, which will contribute to diminishing the amount of greenhouse and gas emissions from the private vehicles and buses that circulate in the area. There is presently a high volume of traffic on the Interior Circuit, where an average of 69,000 vehicles circulate on a daily basis. It has been identified that 99.3% of the vehicles are private, while 0.30% are public buses and 0.40% are related to cargo. Despite the fact that buses do not represent a great volume of total traffic, their impact is relevant due to the low speed at which they circulate. For example, 30 of the sample trips showed that the average speed is 31.8 km/h. This is far below the initial speed for which the highway was designed. The longest trip took 63.9 minutes at an average speed of 14.7 km/h and the fastest trip recorded a speed of 50.4 km/h. Even though the project contributes to the air quality and pollution reduction in one of the most important highways of Mexico City, no specific calculation or life cycle carbon assessment has been provided to truly measure the percentage of reduction.</p> <p><i>Source: Secretaría de Obras y Servicios, Dirección General de Proyectos Especiales, Dirección de Construcción de Proyectos Especiales "A". Evaluación Socioeconómica, Mejoramiento Urbano Integral del Circuito Interior de la Ciudad de México. (Ciudad de México, 2013), 9.</i></p>
		<p><u>RECOMMENDATIONS</u></p> <p><i>Develop a life-cycle carbon assessment in order to estimate emissions due to materials extraction and processing, material transport, and project maintenance operation. Calculate the amount of carbon emissions that will be reduced by improving traffic flow.</i></p>
CR1.2 Reduce	2	Improved

<p>Air Pollutant Emissions</p>		<p>The air quality is most affected by activities related to urbanization such as combustion gas, gasoline, diesel and other fuels used in industry, trade, services, households, hospitals and vehicles. In this sense, by improving the traffic flow of the Interior Circuit the project will significantly contribute to the reduction of vehicle air pollutant emissions. On the other hand, according to the Administrative Resolution particulate matter, dust and other air pollutants must also be reduced. The project is implementing some measures and programs for regulating air pollution; some are related to vehicle and transport control and others are focused on avoiding particulate dispersal. Parameters have been established by the NADF-018-AMBT-2009 to irrigate those construction areas producing the most particulate matter with grey water. There are also devices that clean the construction vehicles' tires before they exit the construction area. Any type of particle generation site must be eliminated; in reference to chapter I.30 the routes that transport the residue must be programmed and controlled in order to avoid traffic conflicts. They must be covered and should avoid any type of emission.</p> <p><i>Source: Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Plutarco E. Calles.(Ciudad de México, 2013), 19.</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Molinos.(Ciudad de México, 2013), 20.</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tezontle.(Ciudad de México, 2013), 23.</i> <i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tlalpan.(Ciudad de México, 2013), 18.</i></p> <p><u>RECOMMENDATIONS</u></p> <p><i>The improvement of the Interior Circuit is helping significantly to reduce air pollutant emissions, however detailed studies around these matters have not been produced. It is recommended to develop calculations about the current and expected emissions. This will serve to demonstrate the importance of this project. Also, it is suggested to develop a monitoring and control program for this matter, which can serve to assess this specific issue over time.</i></p>
<p>CR2.1 Assess Climate Threat</p>	<p>0</p>	<p>No score</p> <p>No information has been provided according to assessing climate change threats.</p> <p><i>Source:</i></p> <p><u>RECOMMENDATIONS</u></p> <p><i>As the project is located in an urban area, it will be influenced and affected over time due to climate change. In this context, it is recommended that the project consider some long-term evaluation in order to assess and consider strategies of adaptation for the Interior Circuit infrastructure. Present documents that include ambient temperature conditions, increased frequency of storms, flooding or other events. This will help in the creation of a plan that considers these treats as part of the design life of the project. The plan could also incorporate certain notions about recovery from extreme events and document input from local and regional emergency management officials.</i></p>
<p>CR2.2 Avoid Traps And Vulnerabilities</p>	<p>0</p>	<p>No score</p> <p>No information has been provided on the kind of vulnerabilities that could affect the project area nor the long-term costs associated with it.</p> <p><i>Source: N/A</i></p> <p><u>RECOMMENDATIONS</u></p>

		<p><i>Within the scope of a climate change assessment plan, certain risks must be identified. This should include traps, vulnerabilities and other associated costs. These will influence engineering variables that could be key for the design process. Provide documentation showing the extent to which project concepts, configuration and design have taken into account the need to reduce identified significant risks, traps and vulnerabilities with substantial costs and other negatives. This can be reflected in the assessment of certain variables such as the definition of specific flood prone areas or the location of vulnerable communities.</i></p>
<p>CR2.3 Prepare For Long-Term Adaptability</p>	<p>0</p>	<p>No score</p>
		<p>No information has been provided addressing the creation of more resilient infrastructure as a strategy to fight against climate change.</p>
		<p><i>Source: N/A</i></p>
		<p><u>RECOMMENDATIONS</u></p> <p><i>Identification of certain measures to be implemented to create more resilient and resistant infrastructure in case of some type of event due to climate change.</i></p>
<p>CR2.4 Prepare For Short-Term Hazards</p>	<p>0</p>	<p>No score</p>
		<p>No information has been provided according to the improvement of protection measures to prevent natural and short-term hazards beyond regulations.</p>
		<p><i>Source: N/A</i></p>
		<p><u>RECOMMENDATIONS</u></p> <p><i>Create a list of expected natural hazards in the area and analyze their frequency, severity, risk and probability. Consider design strategies to safeguard against natural hazards. Identify specific areas of the project that can serve these purposes, for example, how green areas can be adapted for retaining stormwater surges.</i></p>
<p>CR2.5 Manage Heat Island Effects</p>	<p>1</p>	<p>Improved</p> <p>Several green areas have been integrated into the project, the largest one being at Insurgentes Avenue, where a linear park is located above the tunnel. The park, fountain and other green spaces protect and reduce urban heat island effects. All existing vegetation will be replanted or transplanted. According to the Administrative Resolution and Article 119 of the LAPTDF fraction 62 III, 67 II, 68 and 88 of the RIAR, the removal, replacement and transplanting of trees is authorized and regulated by the Ministry of Environment. According to the information provided, 870 species will be removed, while 2433 will be replanted and 71 will be transplanted. For the aforementioned interventions, the one located at Tezontle Avenue presents the largest amount of habitat improvement; 422 species are removed while 1201 are replanted and 23 transplanted. However, no more information about the species was found. The vegetated surfaces serve the purpose of creating public space and of reducing heat island effect, which is one of the most pressing issues that Mexico City faces in terms of climate change.</p>
		<p><i>Source: Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Plutarco E. Calles.(Ciudad de México, 2013).</i></p> <p><i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Molinos.(Ciudad de México, 2013).</i></p> <p><i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tezontle.(Ciudad de México, 2013).</i></p> <p><i>Secretaria del Medio Ambiente, Dirección General de Regulación Ambiental. Resolución Administrativa Tlalpan.(Ciudad de México, 2013).</i></p>

		<p>RECOMMENDATIONS</p> <p><i>Of the major risks that Mexico City confronts, heat island effect is one of the most pressing, due to expanded urbanization. Provide calculations and information demonstrating the extent to which green areas meet the requirements and work in favor of reducing such effects. Certainly the linear park and other green spaces of the project serve the purpose of heat island effect reduction. Document all the areas and hardscape project areas which could be transformed to meet this requirement, as impermeable surfaces absorb a large percentage of the incident solar radiation, heating the surrounding air. Designate a specific minimum shading requirement, at least for the green public spaces of the project.</i></p>
CR0.0 Innovate Or Exceed Credit Requirements		N/A
	3	

OVERALL:

169	Urban Improvement and Integral Maintenance of the Interior Circuit, Mexico.
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APPENDIX E: SOURCES

DOCUMENTATION PROVIDED
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