

MARISCAL SUCRE INTERNATIONAL AIRPORT - ECUADOR



Figure 01: General photo of project / Source: El Nuevo Aeropuerto – Foto reportaje por Chris Chalk; September 2013

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1. PROJECT INTRODUCTION

This case study outlines the evaluation of the New Quito International Airport (NQIA), formerly known as the Mariscal Sucre Airport (MSA), which opened in February 2013 after seven years of construction. It is the busiest airport in Ecuador and one of the busiest airports in South America.¹ The airport has a 60% frequency of international flights, allows direct access to the main international airports in the world, and is Ecuador's main national node for air transportation.

The project is owned by the municipality of Quito, with funding for construction and operations provided by private companies. The estimated cost of the project is US \$700 million.² The NQIA will accommodate projected increases in passenger and cargo demand and will be expanded over a concession period of 35 years. Phased development is planned for 2010, 2020, and 2030. The major companies involved are the AECON Group and the Airport Development Corporation (ADC) out of Canada, the HAS Development Corporation out of the United States, and the Compañía de Concesiones Rodoviárias (CCR) out of Brazil. The airport is under the operational management of the Corporación Quitport S.A., the same company that operated the old airport.

The NQIA is the largest hub of TAME (Transportes Aéreos Militares Ecuatorianos), the flag carrier of Ecuador, and has an average of over 100 daily flights. The general demand expected for its first year of operation is more than 5 million passengers.³ From 2006 to 2041, the length of the concession period, it is anticipated that the municipality of Quito will receive US \$800 million that may be used to finance planned subway construction and road projects.⁴

2. PROJECT DESCRIPTION & LOCATION

Accelerated urbanization and development in Quito during previous decades resulted in the city's absorption of the old airport, which posed enormous risks to the densely populated residential area of the city's northern sector and led to the vision for a new airport. The site for the NQIA was selected approximately 25 years ago. At the end of the seventies, the Civil Aviation Direction (Dirección de Aviación Civil) compensated landowners with over five hectares (ha) and relocated small tenants, both through swaps or land purchases. Since 1980, the NQIA site has been under one title.⁵

According to the Plan for Local Development of the Metropolitan District of Quito 2012 – 2022, which was drafted in December 2011, the new airport is considered a major driver of tourism and the economy. Moreover, relocation of the airport out of the central area has been critical to the city's efforts to renew its historical center and create a metropolitan park in the footprint of the old airport.⁶ In terms of physical infrastructure, the new airport includes a 4,100 meter landing strip, a passenger building, an administrative building, national and international cargo buildings, navigation systems, a catering building, and a wastewater treatment plant. The terminal building is estimated to be 38,000 m².

¹ <http://www.aerpuertoquito.aero>

² Idem

³ Idem

⁴ http://www.elcomercio.com/quito/aerpuerto-Quito-inauguracion-Tababela-ecuador-aereo_0_790120990.html.

⁵ IDB. "Project Status and Compliance". *Quito International Airport Project Environmental And Social Strategy*.

⁶ Municipio Del Distrito Metropolitano De Quito. *Plan De Desarrollo 2012 – 2022*. December, 2011. Pp 126.

The site of the NQIA, which comprises 1,500 ha, was chosen as an appropriate location to accommodate relocation of the city's airport, including the expanded capacity necessary to meet growing passenger demand. The airport is situated on a plateau ranging in elevation from 2,350 meters to 2,425 meters above sea level, in the Oyamburo plain near the town of Tababela, about 18 kilometers east of Quito. The site is bounded by deep valleys with ravines ranging from 160 to 300 meters deep; watercourses are located on the northern, western and eastern sides of the site. Prior to construction of the airport, the site was undeveloped and undisturbed, with a range of habitat conditions and a high level of biodiversity.⁷

Land in the vicinity of the NQIA is predominantly rural and agricultural. However, in recent years, an increase in residential development has occurred in the area, which is largely due to out-migration from Quito.⁸ The expansive urban growth in the last decade has resulted in the loss of approximately 395 ha of ecologically protected area, the loss of 10,754 ha of forest, and the loss of 6,413 ha of protected farmland.⁹

Approximately 60 ha within the NQIA site will be allocated for light industrial development for a Free Trade Zone that will be developed as part of the project. The Free Trade Zone will increase to 220 ha during the expansion. While not part of the project, the NQIA will provide between 50 and 75 ha of space for possible military use. The Military Area will be developed and operated as an independent development (including access and servicing requirements) by the Military of Ecuador.¹⁰

⁷ IDB. "Environmental and Social Conditions". *Quito International Airport Project Environmental And Social Strategy*.

⁸ Oswaldo Granda P. "Gran Impacto En La Región De Los Proyectos Metropolitanos". *Plan Parcial De Ordenamiento Territorial De Las Parroquias Nororientales: Puenbo, Pifo, Tababela, Yaruqui, Checa, El Quinche y Guayllabamba. Informe Final: Resumen Ejecutivo Del Diagnóstico*. May 2006. Pp 9

⁹ Municipio Del Distrito Metropolitano De Quito. "Expansión urbana y deterioro de los recursos naturales". *Plan De Desarrollo 2012 – 2022*. December, 2011. Pp 32.

¹⁰ IDB. "Project Components". *Quito International Airport Project Environmental And Social Strategy*.

New Quito International Airport, Ecuador

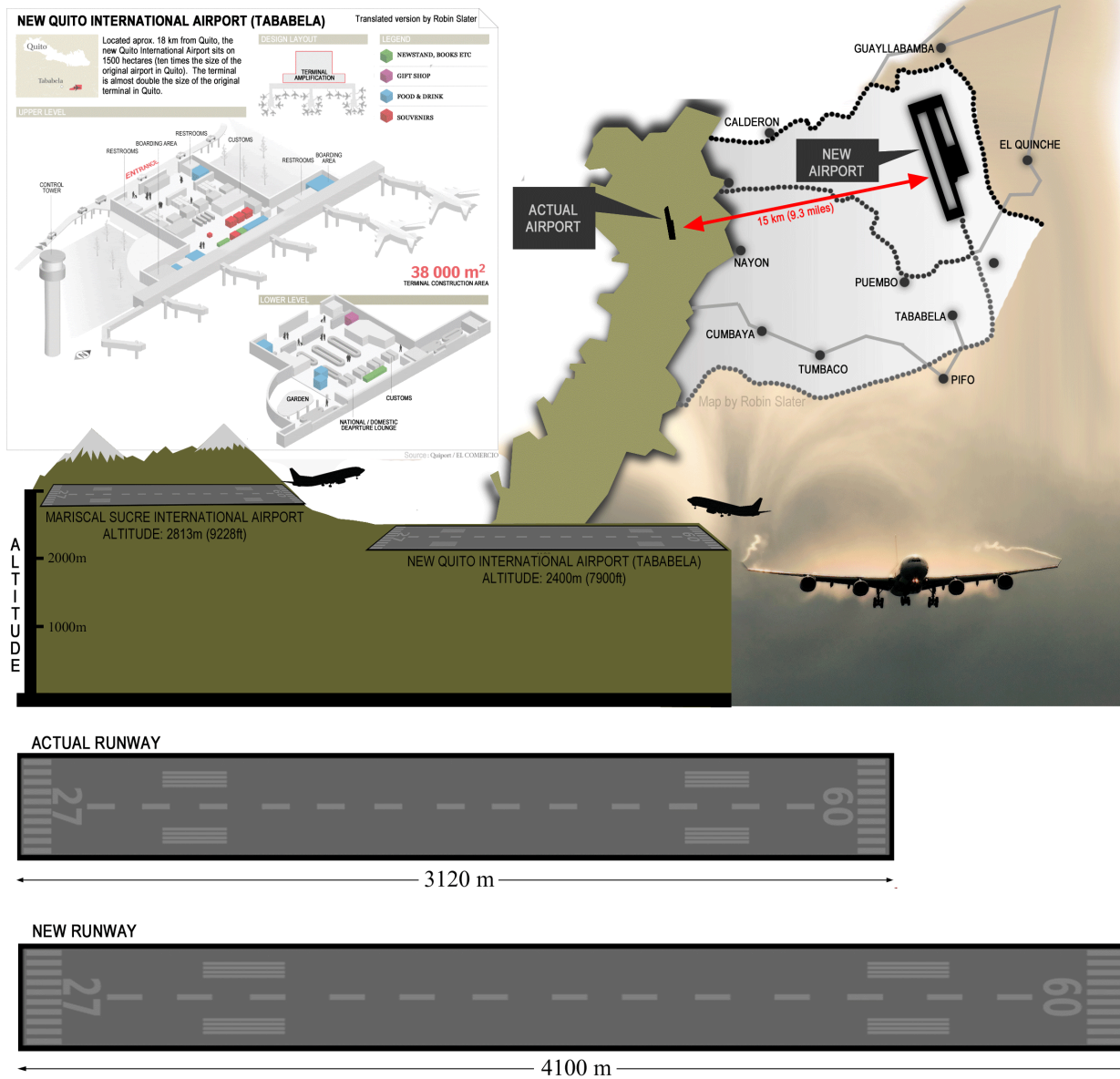


Figure 02: Project data & location map

Source: <http://www.sangay.com/ecuadorguide/wp-content/uploads/2012/05/TABELA-AIRPORT-GRAPHIC.gif>; September 2013

3. APPLICATION OF THE ENVISION RATING SYSTEM¹¹

The *Envision* rating system is a set of criteria that assess and evaluate any specific piece of infrastructure. In this case the infrastructure to be assessed is the New Quito International Airport (NQIA) or Nuevo Aeropuerto Internacional Mariscal Sucre by its name in Spanish. The main intent of this rating is to evaluate the project design, construction, and operation, in order to provide recommendations for improvement in the future.

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 has been met for a particular credit. In each of the five categories there is a specific credit called “Innovative or exceed credit requirements”. This is an open window to reward exceptional performance or the application of innovative methods.

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 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 positive impact for the given credit criteria. 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 available to the public on the ISI¹² and Zofnass Program¹³ websites.

Appendix C provides a table with the detailed project assessment, specifications for each of the credits, and recommendations for the New Quito International Airport project.

¹¹ Anthony Kane, Zofnass program research director, and Salmaan Khan, research assistant, wrote most parts of this section.

¹² www.sustainableinfrastructure.org

¹³ www.zofnass.org

4. EVALUATION CATEGORIES

4.1. QUALITY OF LIFE

The first category of the *Envision* rating system is Quality of Life. The assessment here mainly refers to the impact of the project on the surrounding communities and their well-being. As stated in the *Envision* manual, “Quality of Life particularly focuses on assessing whether infrastructure projects are in line with community goals, incorporated into existing community networks, and will benefit the community long-term.”¹⁴ It also determines if the project is aligned with the community needs.

This category is divided into 3 subcategories and 12 credits: Purpose (QL 1.1, QL 1.2, QL 1.3, and QL 1.4), Community (QL 2.1, QL 2.2, QL 2.3, QL 2.4, QL 2.5, and QL 2.6) and Well-Being (QL 3.1, QL 3.2, QL 3.3).

CREDIT SCORING

			IMPROVED	ENHANCED	SUPERIOR	CONSERVING	RESTORATIVE
1	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		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

Figure 03: Quality of life category, credits distribution.

4.1.1. Purpose:

In the **Purpose subcategory**, NQIA has performed well, with three credits evaluated as Conserving (QL 1.1 Improve Community Quality of Life, QL 1.2 Stimulate Sustainable Growth and Development, and QL 1.3 Develop Local Skills and Capabilities).

From the initial phases of the airport’s construction, emphasis has been placed on hiring local individuals and companies, and on providing necessary training to comply with legal and technical requirements of the project. Overall, Quitport has implemented a comprehensive Social Management Plan that includes continuous public consultation and participation with all the communities affected by the project, as well as permanent monitoring to measure negative and positive impacts. Different actors and groups, such as local authorities, the airport contractors, Ecuadorian and international investors, leaders of parish councils, and local populations, who are impacted by the construction and operation of the NQIA, have been identified. Quitport currently engages in continuous open communication with these interest groups.

¹⁴ *Envision* Guidance Manual, p.30

Even though the economy of Ecuador is highly dependent on exports of raw materials and oil, like most Latin American countries, other sectors such as tourism, agriculture, and product exports are growing. Distribution of these products partially relies on a good international network of air transportation. Therefore, the NQIA makes a significant contribution to the region's development and promotes employment of residents in the surrounding communities.

Throughout the development process, one of the main goals of the NQIA has been to align project requirements with the community needs of the six neighboring parishes. To this end, the Social Management Plan includes employment training and targeted investments to improve the overall livability of the surrounding parishes. Socioeconomic conditions of the communities closest to the project have been positively affected by the presence of new businesses and industries linked to airport activities. The NQIA has strengthened both individual and collective capacities for gainful employment by the project through implementation of a Social Investment Plan. This Plan includes the provision of technical training, integration of local communities, and investment in existing physical and community assets.

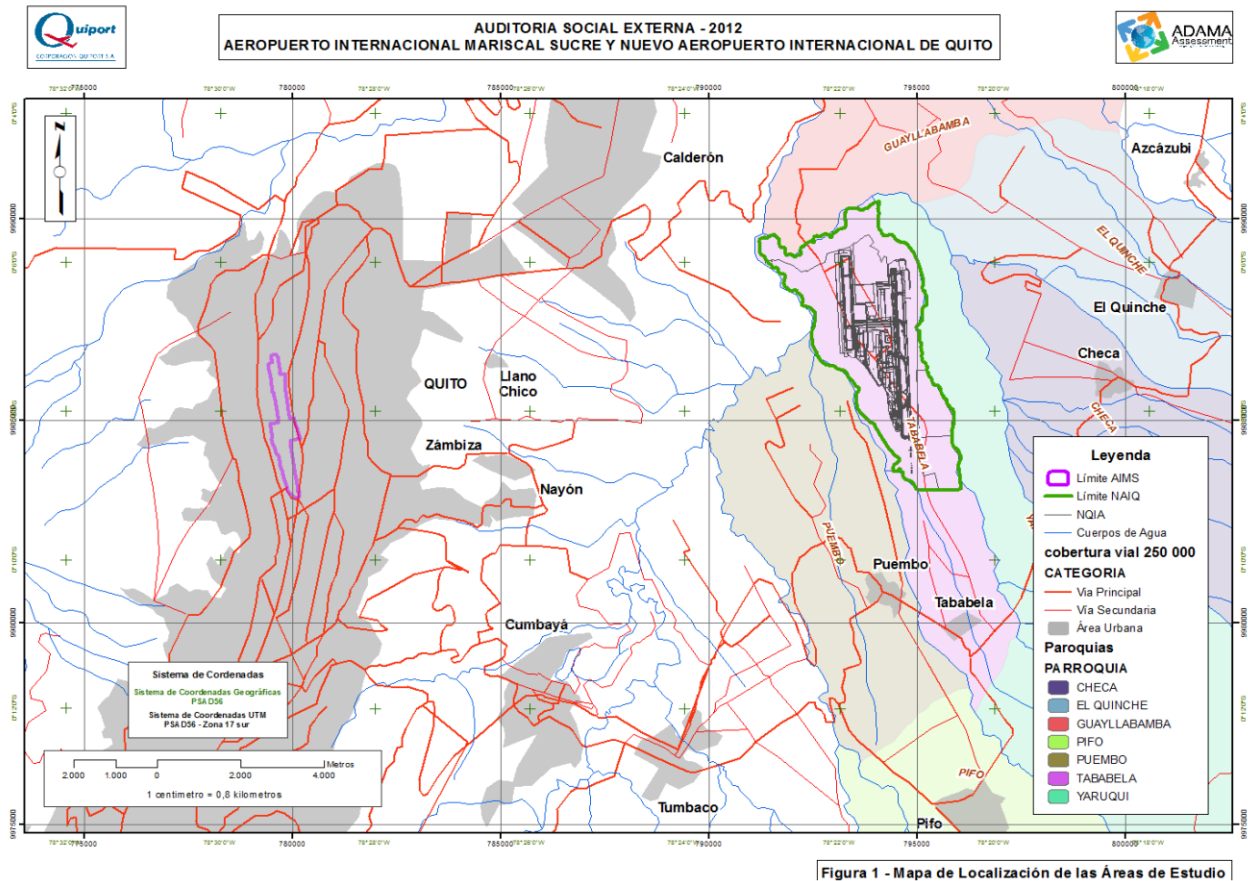
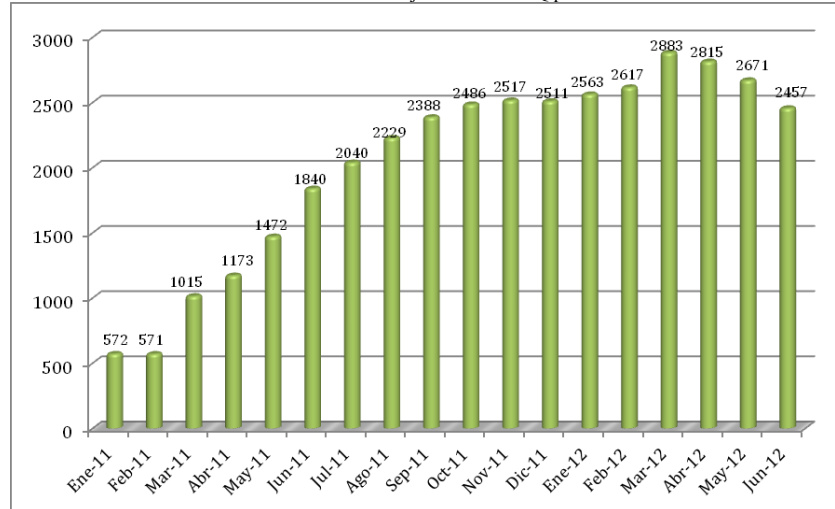


Figure 04: Location map of the areas of study

Source: ADAMA assessment. Auditoria Social Externa 2011 - 2012. Aeropuerto Internacional Mariscal Sucre & Nuevo Aeropuerto Internacional De Quito. Septiembre 10, 2012.

Gráfico 21 - Total de Trabajadores del NAIQ por Meses 2011-2012.



Elaborado por: ADAMA, 2012

Figure 05: The distribution of all workers to build the NAIQ for each month of 2011 and first half of 2012
 Source: ADAMA assessment. Auditoria Social Externa 2011 - 2012. Aeropuerto Internacional Mariscal Sucre & Nuevo Aeropuerto Internacional De Quito. Septiembre 10, 2012. pp 66.

4.1.2. Community:

In the **Community subcategory**, NQIA has a mixed performance, with one credit evaluated as Conserving (QL 2.2 Minimize Noise And Vibration), one credit evaluated as Enhanced (QL 2.6 Improve Site Accessibility, Safety & Wayfinding), two credits evaluated as Improved (QL 2.1 Enhance Public Health and Safety, and QL 2.4 Improve Community Mobility and Access), and two credits evaluated as No score (QL 2.3 Minimize Light Pollution, and QL 2.5 Encourage Alternative Modes of Transportation).

One of the biggest concerns of the NQIA has been to ensure the public health and safety of all actors involved in different phases of the project, and to minimize negative impacts on the adjacent communities. During the construction and operation phases, the project team followed higher standards for industrial safety and occupational health in excess of local requirements. Policies and procedures were established to maintain safe and healthy work environments, and to minimize the risks to which workers are exposed. For the operational phase of the NQIA, a special study of safety and wayfinding signage was implemented. This study considered ways to improve accessibility to the airport, passenger movement within the terminal building, and physical safety and security measures in relation to the operation of the building.

The project team is also concerned about the impacts of noise and light pollution from the airport on the livability of adjacent communities. These impacts are inherent to the operation of an airport. However, periodic monitoring will ensure that noise levels do not exceed maximum allowable values. In terms of lighting, an adequate safety lighting system is required for the project in accordance with Ecuadorian standards and international regulations. However, the project could implement strategies to minimize light pollution in the future, which would reduce excessive glare and conserve energy.

The location of the NQIA outside of the city helps to reduce congestion in Quito while promoting urban sprawl and the use of personal vehicles instead of less-polluting transportation modes. Additional infrastructure has been constructed and more is under construction; however, non-motorized modes of transportation need to be encouraged to reduce vehicle emissions.

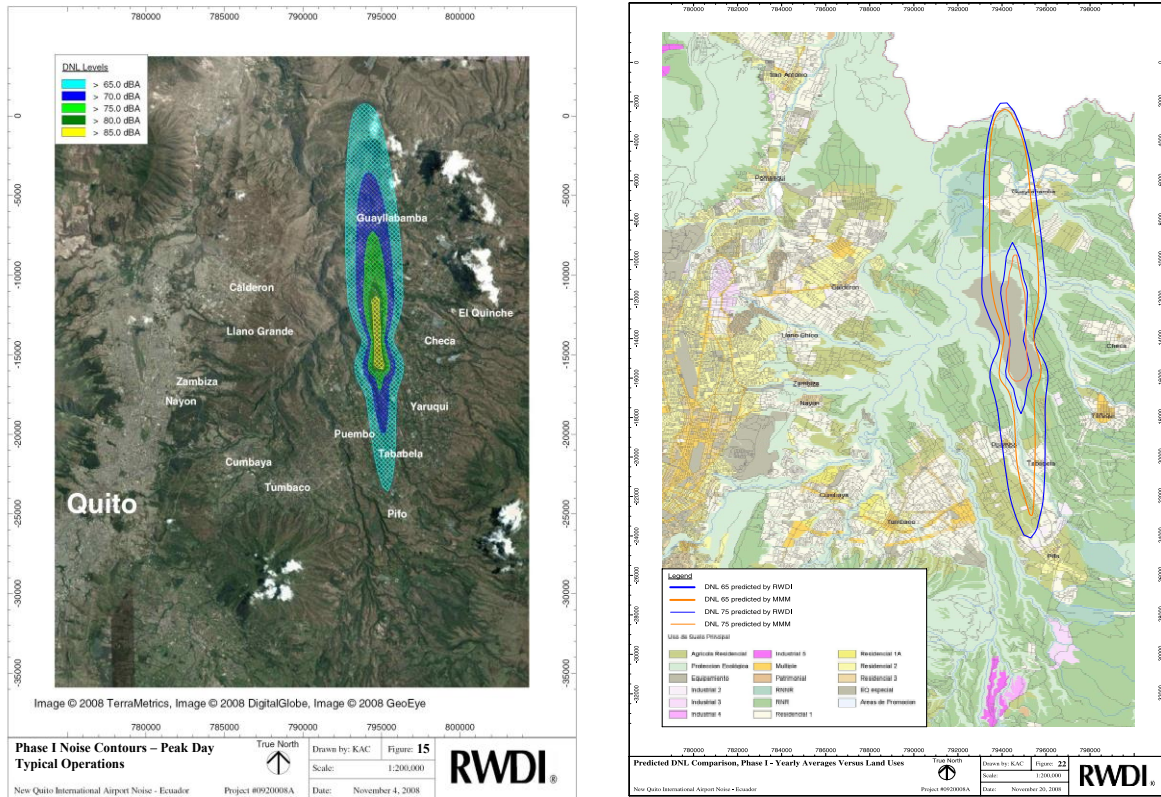


Figure 06 & 07: Location and noise contours / Phase I & Land Uses
 Source: RWDI Air Inc. New Quito International Airport Air Traffic Noise Impact Assessment Phase I – Current Fleet Mix Quito, Ecuador. November 21, 2008

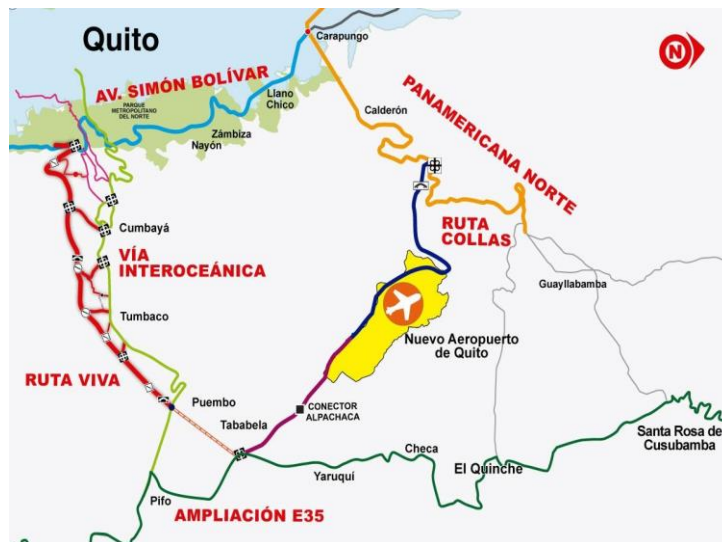


Figure 08: Connections from Quito city to the airport
 Source: ADAMA assessment. Estudio De Urbanización Inducida De Las Parroquias Del Área De Influencia Directa Del Nuevo Aeropuerto Internacional De Quito. September, 2012.

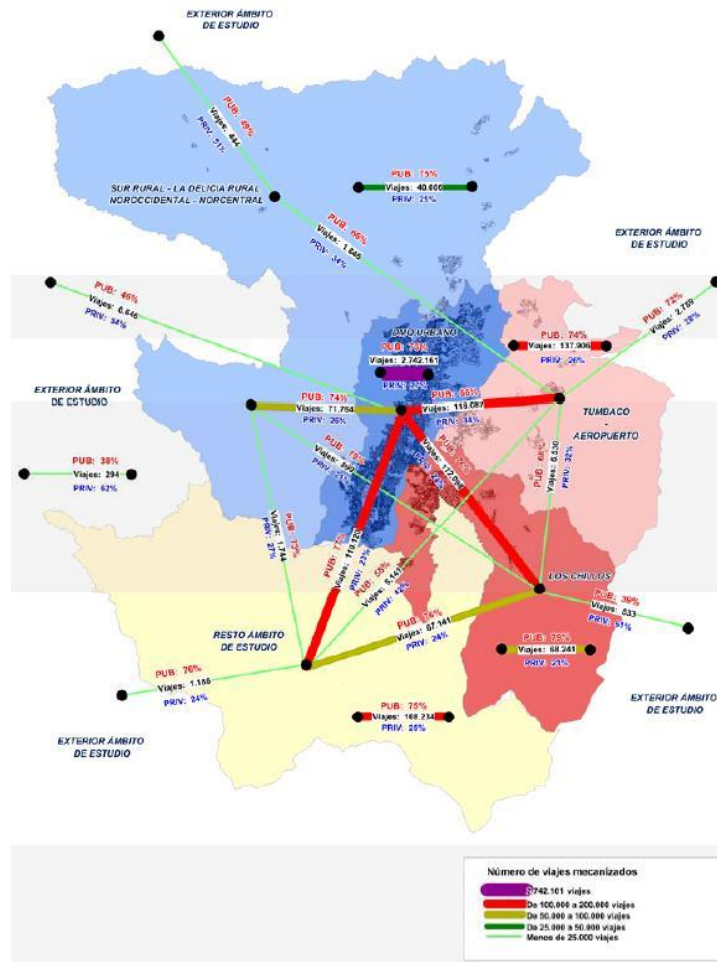


Figure 09: Graphical representation of commuter flows between macro areas and transportation modes/Source: Municipio Del Distrito Metropolitano De Quito. Plan De Desarrollo 2012 – 2022. December 2011.

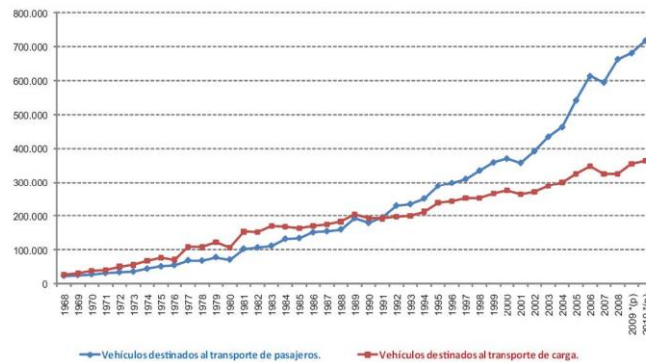


Figure 10: Evolution of passenger and cargo in Ecuador. Vehicle numbers. Series 1968 - 2010 (INEC, 2010:11). The progressive growth shows that the existent road network will be saturate.
Source: Municipio Del Distrito Metropolitano De Quito. Plan De Desarrollo 2012 – 2022. December 2011.

4.1.3. Wellbeing:

In the **Wellbeing subcategory**, the NQIA has performed fairly well, with one credit evaluated as Superior (QL 3.1 Preserve Historic And Cultural Resources), and two credits evaluated as Improved (QL 3.2 Preserve Views And Local Character, and QL 3.3 Enhance Public Space).

Though the NQIA project does not negatively impact historic sites, local character, or existing public spaces because of its location outside of the city, it will have a significant impact on the livability of surrounding communities. The airport will drastically change the landscape and bring new development to an area that has experienced constant development in recent years. The airport is anticipated to generate new airport-related industries, increase traffic, and cause changes to property values. Therefore, the NQIA has maintained constant contact with stakeholders and community leaders since the beginning of the project's design, in order to mitigate negative impacts and to respond to requests made by the local population. Some responses have included targeted investments which have provided funds for community sporting facilities and equipment, and education programs. In addition, different programs have been implemented to advance the long-term wellbeing of the larger social fabric of the area.

Prior to the start of construction, several onsite exploratory activities were performed regarding archaeological monitoring to ensure the protection and preservation of cultural and historical resources. Quitport worked with the communities neighboring the NQIA to preserve and improve the Alpachaca Corridor. This important historic road links the parishes of Tababela with other settlements, and has historical and cultural importance to local parishes and people because it dates back to Inca times and has been maintained ever since. To mitigate visual impacts of the project, several measures have been taken to restore vegetation in affected areas. The airport implemented a reforestation plan using native species (acacias) to restore the landscape to its natural condition prior to agricultural activity and the introduction of foreign species into the ecosystem. In addition, the NQIA invested in preservation of the surrounding system of ravines, watercourses, wildlife, and native forest.

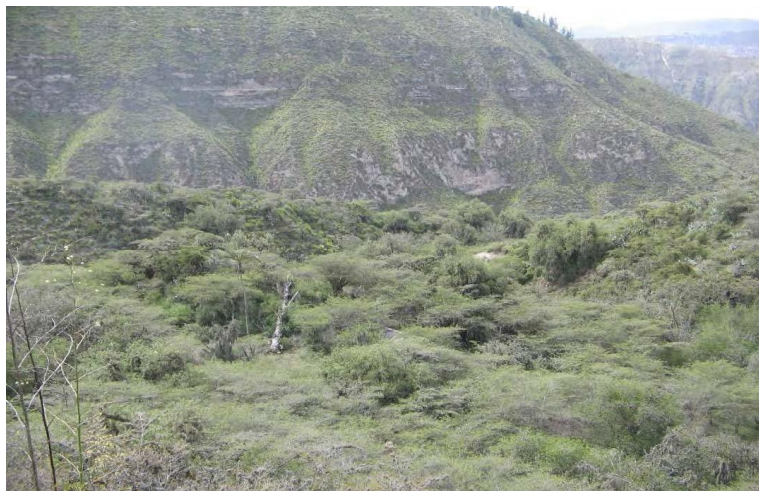


Figure 11: Acacias vegetation. Top of the ravine of Urvia River.
Source: Geomanagement. Plan para la Protección de las Áreas Ambientalmente Sensibles del Nuevo Aeropuerto Internacional de Quito (NAIQ). October 2008.

4.1.4. Summary of results, Quality of Life Category:

The table below (figure 12) shows the distribution of credits as well as the level of performance achieved in each credit:

NEW QUITO INTERNATIONAL AIRPORT, ECUADOR				PT.	Performance	% Total	max
1	QUALITY OF LIFE	PURPOSE	QL1.1 Improve Community Quality of Life	20	Conserving	80.0%	25
2			QL1.2 Stimulate Sustainable Growth & Development	13	Conserving	81.3%	16
3			QL1.3 Develop Local Skills And Capabilities	12	Conserving	80.0%	15
4		COMMUNITY	QL2.1 Enhance Public Health And Safety	2	Improved	12.5%	16
5			QL2.2 Minimize Noise And Vibration	8	Conserving	72.7%	11
6			QL2.3 Minimize Light Pollution	0	No Score	0.0%	11
7			QL2.4 Improve Community Mobility And Access	1	Improved	7.1%	14
8			QL2.5 Encourage Alternative Modes of Transportation	0	No Score	0.0%	15
9			QL2.6 Improve Site Accessibility, Safety & Wayfinding	3	Enhanced	20.0%	15
10		WELLBEING	QL3.1 Preserve Historic And Cultural Resources	7	Superior	43.8%	16
11			QL3.2 Preserve Views And Local Character	1	Improved	7.1%	14
12			QL3.3 Enhance Public Space	1	Improved	7.7%	13
QL0.0 Innovate Or Exceed Credit Requirements				0	N/A		
QL				68		37.6%	181

Figure 12: Summary of results in the Quality of Life category

In the **Quality of Life** category, the biggest opportunities for project improvement are in the Community and Wellbeing subcategories. Considering all credits and the maximum possible values for each indicator, the percentage of achievement equates to 37.6%, or 68 points out of 181.

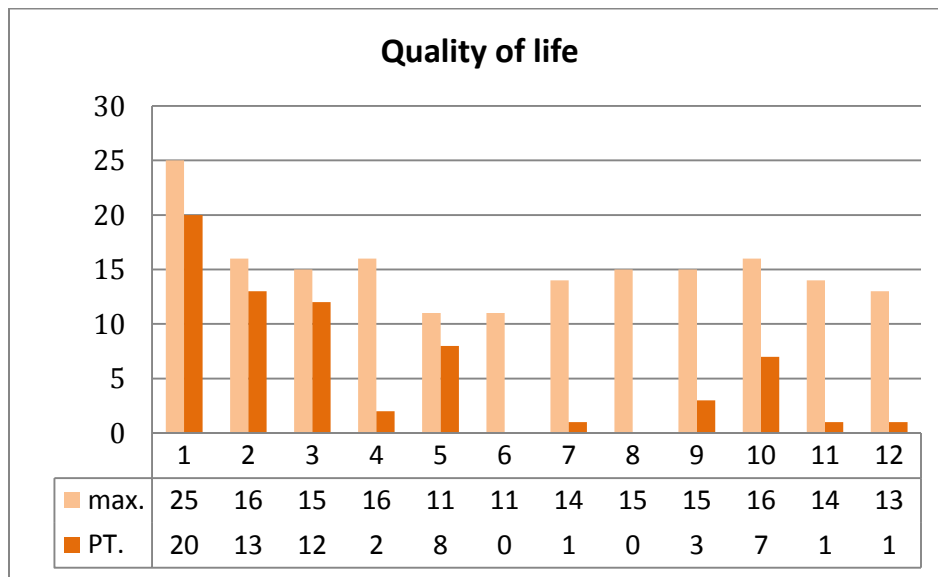


Figure 13: Summary of results in the Quality of Life category

4.2 LEADERSHIP

Envision’s Leadership category evaluates the collaboration, management and planning of the project’s team, as well as its stakeholders. Envision states that “communicate and collaborate early on, involve a wide variety of people in creating ideas for the project, and understand the long-term, holistic view of the project and its life cycle.”¹⁵

The 12 credits in this category are: Collaboration (LD 1.1, LD 1.2, LD 1.3, LD 1.4), Management (LD 2.1, LD 2.2) and Planning (LD 3.1, LD 3.2, LD 3.3).

CREDIT SCORING

			IMPROVED	ENHANCED	SUPERIOR	CONSERVING	RESTORATIVE	
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	LEADERSHIP	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	LEADERSHIP	PLANNING	LD3.1 Plan for long-term monitoring and maintenance	1	3		10	
20			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

Figure 14: Leadership category, credits distribution.

4.2.1. Collaboration:

In the **Collaboration subcategory**, the NQIA performs fairly well, with three credits evaluated as Superior (LD 1.1 Provide Effective Leadership and Commitment, LD 1.2 Establish a Sustainability Management System, and LD 1.3 Foster Collaboration and Teamwork) and one credit evaluated as Enhanced (LD 1.4 Provide For Stakeholder Involvement).

The Environmental Management Plan (EMP) and the Social Management Plan (SMP) for the NQIA provide blueprints for the project’s principles of sustainability. These plans address economic, environmental, and social aspects of the project, and include concrete activities and continuous monitoring to ensure that proposed goals are achieved. The company also has an Environmental Management System (EMS) that operates under the guidelines of an Integrated Management System under the ISO standards.¹⁶ These standards control all procedures associated with the development of and activities performed at the airport. Moreover, the project team approaches the project systematically. Different phases of the project are managed through collaborations between a broad set of stakeholders and a multidisciplinary team with the objective of optimizing the overall performance of the NQIA.

¹⁵ *Envision Guidance Manual*, p.60

¹⁶ ISO 9001:2008 (Quality), ISO 14001:2008 (Environment) and OHSAS 18001:2004 (Safety, Health)

Since the design phase of the NQIA, the Public Consultation and Disclosure Plan (PCDP), which is a component of the Social Management Plan, has ensured that adequate information has been provided to protect and include affected people and other stakeholders in the process. Moreover, these groups have been able to raise their concerns in time for measures to be incorporated into the project design. In terms of communication during the operational phase, the PCDP allows constant and permanent linkages and channels of communication between stakeholders and the NQIA management team.

The project includes a plan to lead the closure and abandonment of the old airport, and to reintegrate the area into the city of Quito. In addition, all subcontractors and suppliers of the airport must comply with the Sustainability Policy of Quitport and all environmental requirements stipulated in their contracts. Quitport has also implemented an Infractions System for Commercial Operators that responds to the needs of the project to socialize, educate, monitor, and supervise corrective actions in resources management.

4.2.2. Management:

In the **Management subcategory**, one credit was evaluated as No Score (LD 2.1 Pursue By-Product Synergy Opportunities), and one credit was evaluated as Superior (LD 2.2 Improve Infrastructure Integration).

The NQIA is already operational, but it will likely be expanded in the future. Thus, identification and characterization of nearby facilities could contribute to the future pursuit of potential byproduct synergies. Integrating a broader and more comprehensive understanding of the project as a whole, or among other large infrastructure projects, could allow the project to increase the sustainability of natural systems and resources. In regard to the materials used for the NQIA's construction, no specific program for identifying and using unwanted materials from nearby facilities has been developed. However, in order to reduce project costs and the use of raw materials, soil extracted during excavation was used in filling and leveling.

In terms of the transportation network, the NQIA project considered regional strategic plans and municipal road improvement projects in its location and design. The project team improved the existing road infrastructure in order to achieve a better connection between the airport and Quito, but still further infrastructure and the integration of other transportation modes is needed. According to the Metropolitan Road Plan, in the future two roads will connect the airport with the existing road network. Today, the only access is over the South road, known as Ruta Zambiza. Quitport provided additional investments for the Alpachaca connector road, which was required to link the airport to the existing transportation network. The North road connection, known as Ruta Collas, is currently under construction.

In terms of water infrastructure, the design of the project considered existing water bodies in the surrounding area, and included an integrated water management system to prevent water contamination and flooding.

4.2.3. Planning:

In the **Planning subcategory**, two credits were evaluated as Superior (LD 3.1 Plan for Long-Term Monitoring & Maintenance, and LD 3.2 Address Conflicting Regulations & Policies), and one credit was evaluated as Enhanced (LD 3.3 Extend Useful Life).

Plans regarding ecological protection, mitigation and enhancement measures were incorporated at the early stages of the NQIA project. The documentation provided includes long-term strategies and monitoring measures based on the actions and objectives defined by each plan. To guarantee plan implementation, funds and responsibilities were assigned and specific people and organizations have been designated to monitor and maintain the different programs included in the project.

With regards to conflicting regulations that could create barriers to the implementation of sustainable practices in the airport, three different issues have been identified. Two conflicts relate to the requirement for changes to land use in reclaiming the old airport site as a park, and in developing the new airport on a rural site. Quitport participated in a closure plan and land use study, and helped the municipality of Quito update its land use ordinance. The third conflict is related to nitrogen oxide (NOx) emissions. As a result, a Strategy for Reducing Emissions of NOx for the NQIA was developed to provide realistic mitigation measures to reduce NOx emissions with complementary restrictions for airplanes.

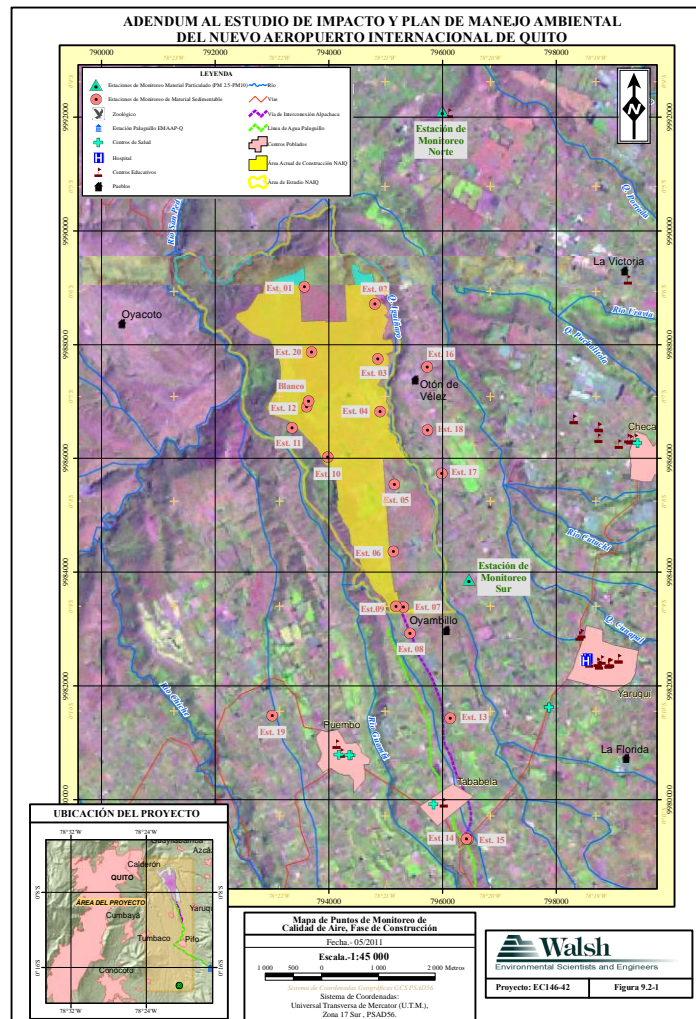


Figure 15: NQIA construction site and urban locations
 Source: WALSH. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito. May, 2011. Pp 74.

4.2.4. Summary of results, Leadership category:

The table below (figure 15) shows the distribution of credits as well as the level of performance achieved in each credit:

NEW QUITO INTERNATIONAL AIRPORT, ECUADOR				PT.	Performance	% Total	max
13	LEADERSHIP	COLLABORATION	LD1.1 Provide Effective Leadership And Commitment	9	Superior	52.9%	17
14			LD1.2 Establish A Sustainability Management System	7	Superior	50.0%	14
15			LD1.3 Foster Collaboration And Teamwork	8	Superior	53.3%	15
16			LD1.4 Provide For Stakeholder Involvement	5	Enhanced	35.7%	14
17	LEADERSHIP	MNGMT.	LD2.1 Pursue By-Product Synergy Opportunities	0	No Score	0.0%	15
18			LD2.2 Improve Infrastructure Integration	7	Superior	43.8%	16
19	LEADERSHIP	PLANNING	LD3.1 Plan For Long-Term Monitoring & Maintenance	10	Superior	100.0%	10
20			LD3.2 Address Conflicting Regulations & Policies	4	Superior	50.0%	8
21			LD3.3 Extend Useful Life	3	Enhanced	25.0%	12
			LD0.0 Innovate Or Exceed Credit Requirements	0	N/A		
		LD		53		43.8%	121

Figure 16: Summary of findings in the Leadership category

In the **Leadership category**, the biggest opportunities for project improvement are within the Management subcategory. Considering all credits and the maximum possible values for each indicator, the percentage of achievement adds to 43.8%, or 53 points out of 121.

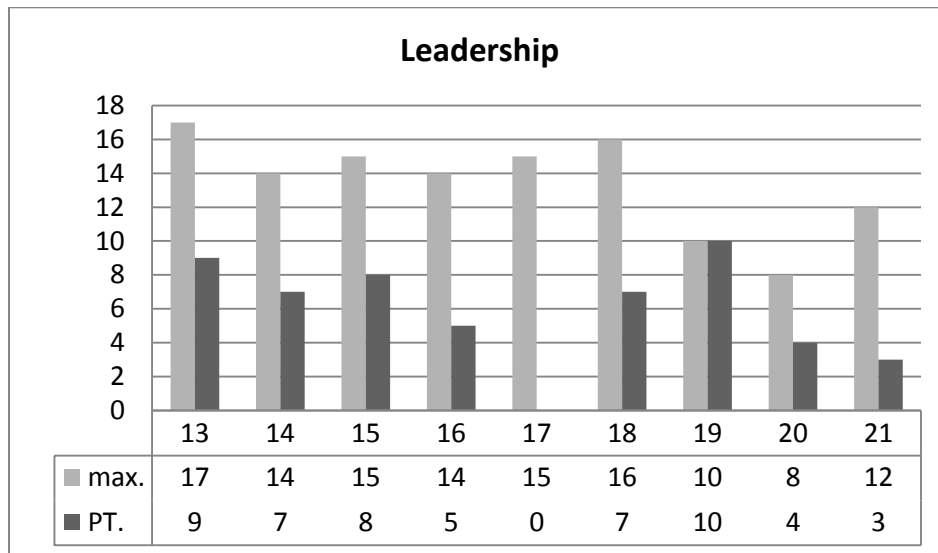


Figure 17: Summary of results in the Leadership category

4.3 RESOURCE ALLOCATION

The Resource Allocation (RA) category deals with the quality and source of the materials used in the project during its construction and operation phases. Use and allocation of materials and other resources has a great impact on the overall sustainability of the project. The RA category is divided into 13 credits: Materials (RA 1.1, RA 1.2, RA 1.3, RA 1.4, RA 1.5, RA 1.6, RA 1.7), Energy (RA 2.1, RA 2.2, RA 2.3) and Water (RA 3.1, RA 3.2, RA 3.3).

CREDIT SCORING

			IMPROVED	ENHANCED	SUPERIOR	CONSERVING	RESTORATIVE	
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	

Figure 18: Resource Allocation category, credits distribution.

4.3.1. Materials:

In the **Materials subcategory**, out of seven credits, one was evaluated as Enhanced (RA 1.5 Divert Waste from Landfills), and one was assessed as Conserving (RA 1.6 Reduce Excavated Materials Taken Off Site). Finally, five credits received an evaluation of No Score (RA 1.1 Reduce Net Embodied Energy, RA 1.2 Support Sustainable Procurement Practices, RA 1.3 Use Recycled Materials, RA 1.4 Use Regional Materials, and RA 1.7 Provide for Deconstruction and Recycling).

The project has developed a Comprehensive Waste Management Plan that indicates use of a waste classification system for the collection, disposition and management of all the solid residues produced by airport operations. It is estimated that 50% of the total amount of waste is recycled or reused and 50% is disposed in authorized landfills¹⁷. In addition, the project was constructed in a way that minimized earth removal from the site. The techniques used for cut and fill operations reduced the amount of excavated material taken off site. One goal of the project was to avoid any net import or export of earth by reusing the excavated material for filling or leveling.¹⁸

Though any subcontractor who signs a contract with Quitport Corporation must accept the environmental standards established in the Environmental Management Plan, no specific data was provided about supplier performance regarding materials and sustainable procurements. Therefore, it is unknown if materials have been purchased from suppliers that follow sustainable practices. In addition,

¹⁷ EHS. *Plan de manejo de desechos para el Nuevo Aeropuerto de Quito*. Marzo 2012

¹⁸ WALSH. *Estabilización de Suelos y Control de Erosión. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito*. Mayo 2011. Pp12.

there is no available data to prove that a life cycle energy assessment was performed,¹⁹ and there is very limited information about the use of recycled materials or an inventory of existing materials or structures that may have reuse potential. Therefore, it is unknown whether a reduction in the use of virgin materials was achieved.

Given the specific technical needs and total cost of the project, the level of acquisition of local materials is relatively low. The Monitoring Report of January 2012 indicates that 4.18% of the materials were locally sourced, which did not significantly minimize transportation costs and impacts during the construction phases of the NQIA.²⁰

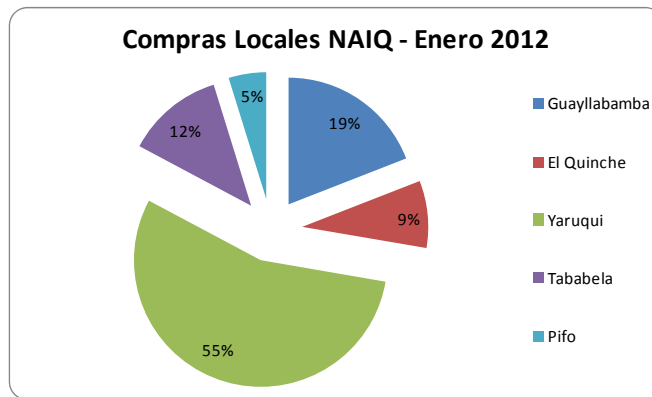
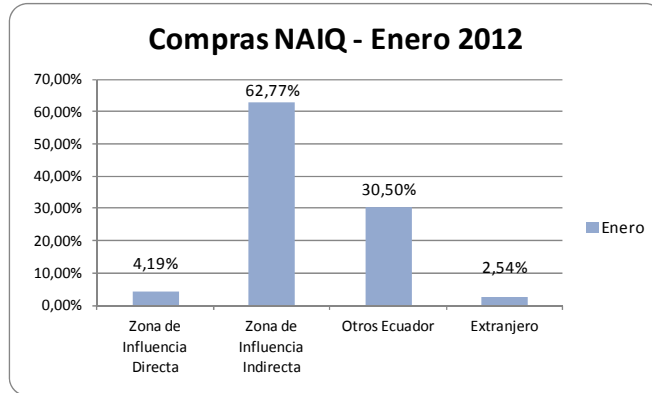


Figure 19 & 20: Local acquisition NQIA, January 2012
 Source: Informe Mensual de Monitoreo Físico, Biótico, de Salud Humana y Social, Enero 2011

¹⁹ In accordance to recognized and accepted methodologies on the materials used.

²⁰ Nuevo Aeropuerto Internacional De Quito. Informe mensual de monitoreo físico, biótico, de salud humana y social. Enero 2012.

Tabla 1
Generación de Residuos por Edificio

Valor promedio mensual de Generación de Residuos por Edificio Operativo (kg) aprox.						
Tipo de Residuos	Operadores del PTB	Operadores GSE	Operadores de Catering	Operadores Ed. Carga Nacional e Internacional	Operadores del Centro Logístico	Total
Residuos Orgánicos	7360,00*	S/D	14949,00*	S/D	S/D	22309,00
Reciclables	6100,00	2125,68	779,00	1310,00	950,00	11264,68
Comunes	1000,75	173,44	560,00	900,00	565,00	3199,19
Peligrosos	380,92*	1049,48*	186,60*	34,00*	22,00*	1673,00
Infecciosos	N/D	1,6*	N/D	N/D	N/D	1,6

Simbología:
 S/D: Sin datos, debido ya que son gestionados como residuos comunes
 N/D: No se registran datos
 * Residuos entregados a Gestores Autorizados

Fuente: Grupo Mera, 2013 (Operador Comercial de locales de comida dentro del Terminal de Pasajeros), HANASKA, 2013 (Empresa que realiza la limpieza y recolección de residuos en el Terminal de Pasajeros) & Personal Administrativo Operadores Comerciales NAIMS, 2013.

Figure 21: Type of waste and source

Source: Quiport SA. Plan de manejo de residuos nuevo aeropuerto internacional Mariscal Sucre de Quito. Junio 2013.

4.3.2. Energy:

In the **Energy subcategory**, out of three credits, one was evaluated as Enhanced (RA 2.3 Commission & Monitor Energy Systems), and two received No Score (RA 2.1 Reduce Energy Consumption, and RA 2.2 Use Renewable Energy).

The project includes internal monitoring of the energy systems and continuous training programs for maintenance personnel to ensure efficient functioning of all operating systems. However, no independent commissioning has been contracted to evaluate the performance of the energy systems. Though the internal monitoring can be viewed as an initial effort to achieve efficiently functioning energy systems, still greater efforts are needed to incorporate long-term monitoring into the project to ensure energy system performance.

No measures to reduce energy consumption during the operation and maintenance phases have been implemented at the NQIA, and therefore no data or materials for analysis are available. But even though the NQIA has not implemented any strategies to incorporate renewable energy sources into the operations of the project, the managers are considering implementation of a photovoltaic system in the medium term.

4.3.3. Water:

In the **Water subcategory**, out of three credits, one was evaluated as Conserving (RA 3.1 Protect Fresh Water Availability), one as Superior (RA 3.3 Monitor Water Systems), and one received No Score (RA 3.2 Reduce Potable Water Consumption).

The project includes a stormwater management system that provides for separation of sediments, accumulation of water in ponds, rainwater harvesting and reuse of water in airport gardens. These

mechanisms reduce impacts to aquifers, groundwater and freshwater sources. A system to manage wastewater treatment is also part of the NQIA. Currently, the NQIA is implementing a biannual program to monitor water quality, which allows for a detailed identification of potential impacts. Thanks to this level of control it is possible to detect sources of water pollution and put appropriate measures in place quickly. Tests have also been conducted on groundwater, surface water, wastewater and rainwater. Identification of potential sources of contamination, as well as concrete measures and prevention strategies and a list of best practices, have been implemented to protect water resources. The goal is that with these integrated water management systems operating, the project will have no net impact on water supply volumes.

The water cycle within the airport involves the following steps, which are not in a particular order: water supply, treatment, storage, distribution, use and disposal. Recommendations for environmental management best practices are included in the Water Contamination Prevention Plan of the NQIA. However, strategies for recycling and reusing water face economic and technical challenges due to the characteristics of the wastewater generated by multiple commercial operators at the airport.

Even though the project includes general considerations and strategies to optimize the use of freshwater resources, the documentation provided does not contain specific data about water consumption and reduction of non-replenishable potable water use.

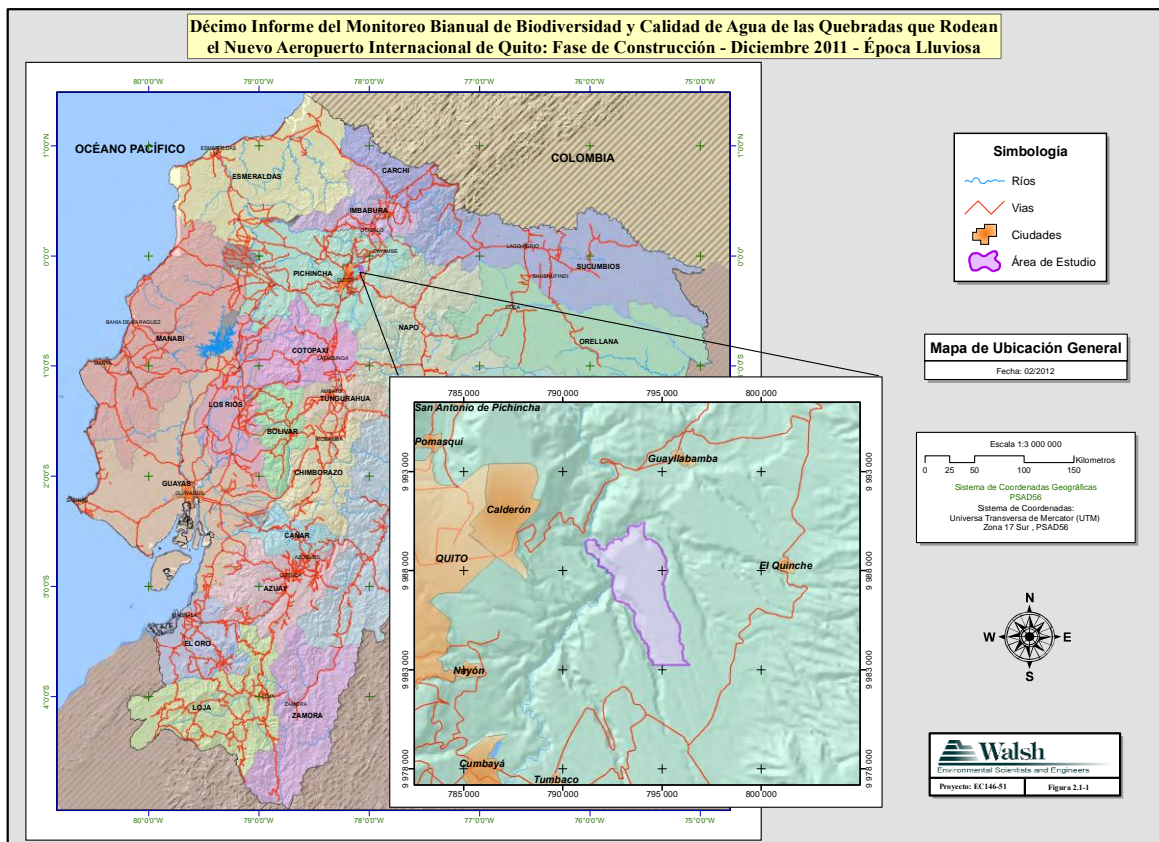


Figure 22: Water monitoring

Source: WALSH. Décimo Informe de Monitoreo Bianual de Biodiversidad y Calidad de Agua de las Quebradas que rodean el el NAIQ: Fase de Construcción, Época Lluviosa - Diciembre 2011. February, 2012. Pp 27

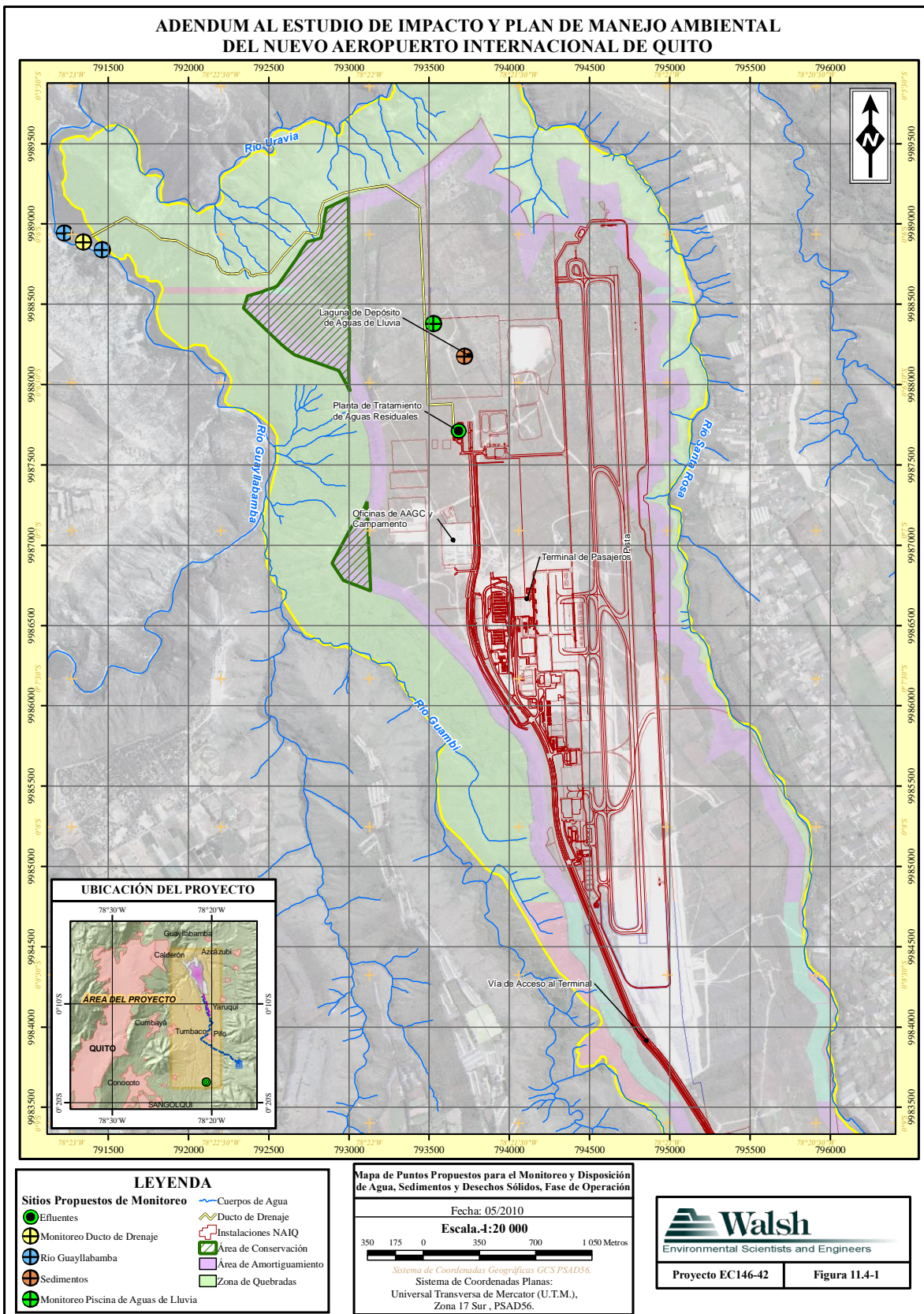


Figure 23: Water monitoring and water management system

Source: WALSH. Décimo Informe de Monitoreo BIANUAL de Biodiversidad y Calidad de Agua de las Quebradas que rodean el el NAIQ: Fase de Construcción, Epoca Lluviosa - Diciembre 2011. February, 2012. Pp 51

4.3.4. Summary of results, Resource Allocation category:

The table below (figure 24) shows the distribution of credits as well as the level of performance achieved in each credit:

NEW QUITO INTERNATIONAL AIRPORT, ECUADOR			PT.	Performance	% Total	max.	
22	RESOURCE ALLOCATION	MATERIALS	RA1.1 Reduce Net Embodied Energy	0	No Score	0.0%	18
23			RA1.2 Support Sustainable Procurement Practices	0	No Score	0.0%	9
24			RA1.3 Used Recycled Materials	0	No Score	0.0%	14
25			RA1.4 Use Regional Materials	0	No Score	0.0%	10
26			RA1.5 Divert Waste From Landfills	6	Enhanced	54.5%	11
27			RA1.6 Reduce Excavated Materials Taken Off Site	6	Conserving	100.0%	6
28			RA1.7 Provide for Deconstruction & Recycling	0	No Score	0.0%	12
29	ENERGY	RA2.1 Reduce Energy Consumption	0	No Score	0.0%	18	
30		RA2.2 Reduce Pesticide and Fertilizer Impacts	0	No Score	0.0%	20	
31		RA2.3 Commission & Monitor Energy Systems	3	Enhanced	27.3%	11	
32	WATER	RA3.1 Protect Fresh Water Availability	17	Conserving	81.0%	21	
33		RA3.2 Reduce Potable Water Consumption	0	No Score	0.0%	21	
34		RA3.3 Monitor Water Systems	6	Superior	54.5%	11	
RA0.0 Innovate Or Exceed Credit Requirements			0	N/A			
RA			38		20.9%	182	

Figure 24: Summary of findings in the Resource Allocation category

The **Resource Allocation category** presents the biggest opportunities for project improvement, especially within the Materials and Energy subcategories. Considering all credits and the maximum possible values for each indicator, the percentage of achievement equates to 20.9%, or 38 points out of 182.

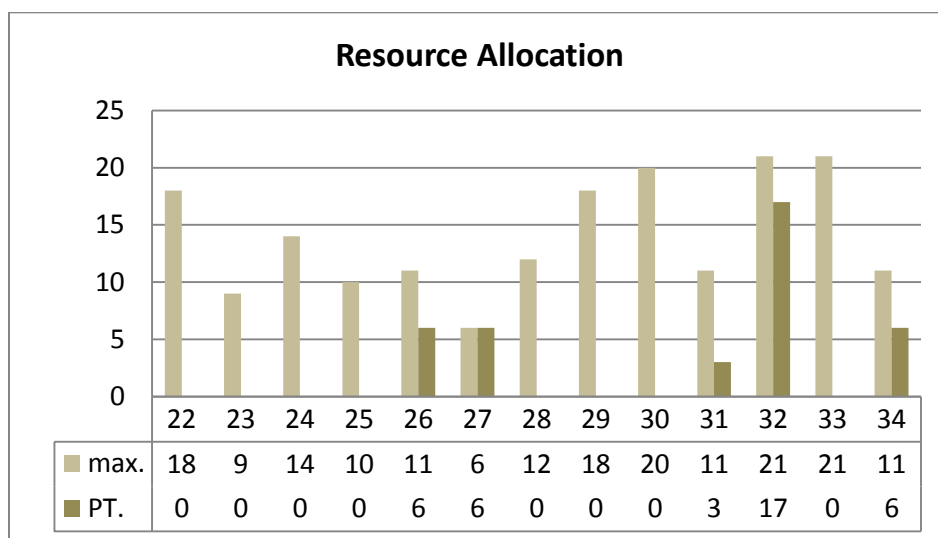


Figure 25: Summary of results in the Resource Allocation category

4.4 NATURAL WORLD

The Natural World category addresses “how to understand and minimize negative impacts while considering ways in which the infrastructure can interact with natural systems in a synergistic, positive way.”²¹ The NW category is divided into 14 credits related to project siting (NW 1.1, NW 1.2, NW 1.3, NW 1.4, NW 1.5, NW 1.6, and NW 1.7), impacts on land and water (NW 2.1, NW 2.2, NW 2.3) and biodiversity (NW 3.1, NW 3.2, NW 3.3, NW 3.4).

CREDIT SCORING

			IMPROVED	ENHANCED	SUPERIOR	CONSERVING	RESTORATIVE	
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	NATURAL WORLD	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	NATURAL WORLD	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	

Figure 26: Natural World category, credits distribution.

4.4.1. Siting:

In the **Siting subcategory**, out of seven credits, three were evaluated as Conserving (NW 1.1 Preserve Prime Habitat, NW 1.2 Preserve Wetlands and Surface Water, and NW 1.6 Avoid Unsuitable Development on Steep Slopes), two as Superior (NW 1.4 Avoid Adverse Geology, and NW 1.5 Preserve Floodplain Functions), and two received No Score (NW 1.3 Preserve Prime Farmland and NW 1.7 Preserve Greenfields).

The NQIA occupies an area of about 1,500 ha on a plateau surrounded by deep ravines and forests that represents a valuable natural fragile ecosystem. The project proposes a plan to legally designate this area as “Protected Forest”,²² as well as a native species reforestation program on the north end of the site that will contribute to the overall capacity for stormwater absorption. In addition, the project implements a 155.5 ha buffer from the edge of streams within 100m of the site inwards towards the plateau. This buffer will help preserve existing water bodies, which also coincide with the geotectonic risk areas, and maintain and enhance the surrounding habitat. The project will also establish permanent monitoring programs for water body and wildlife quality.

The Caraburo Plateau, on which the project was constructed, presented the ideal conditions for the airport location: large expanse of undeveloped flat land with proximity to Quito. Therefore, the project

²¹ Envision Guidance Manual, p.116

²² The legal figure of “Protected Forest” prohibits human settlements in the area, in order to protect the above areas, reduce resource pressure and water bodies and determine management zones within the protected area.

was located on a greenfield site, with minimal consideration for the redevelopment of a brownfield. Furthermore, according to the soil analysis,²³ the land would have been suitable for agricultural use. However, as 560 ha comprise pervious surfaces and 157 ha comprise impervious surfaces, the site's infiltration capabilities will largely be preserved.

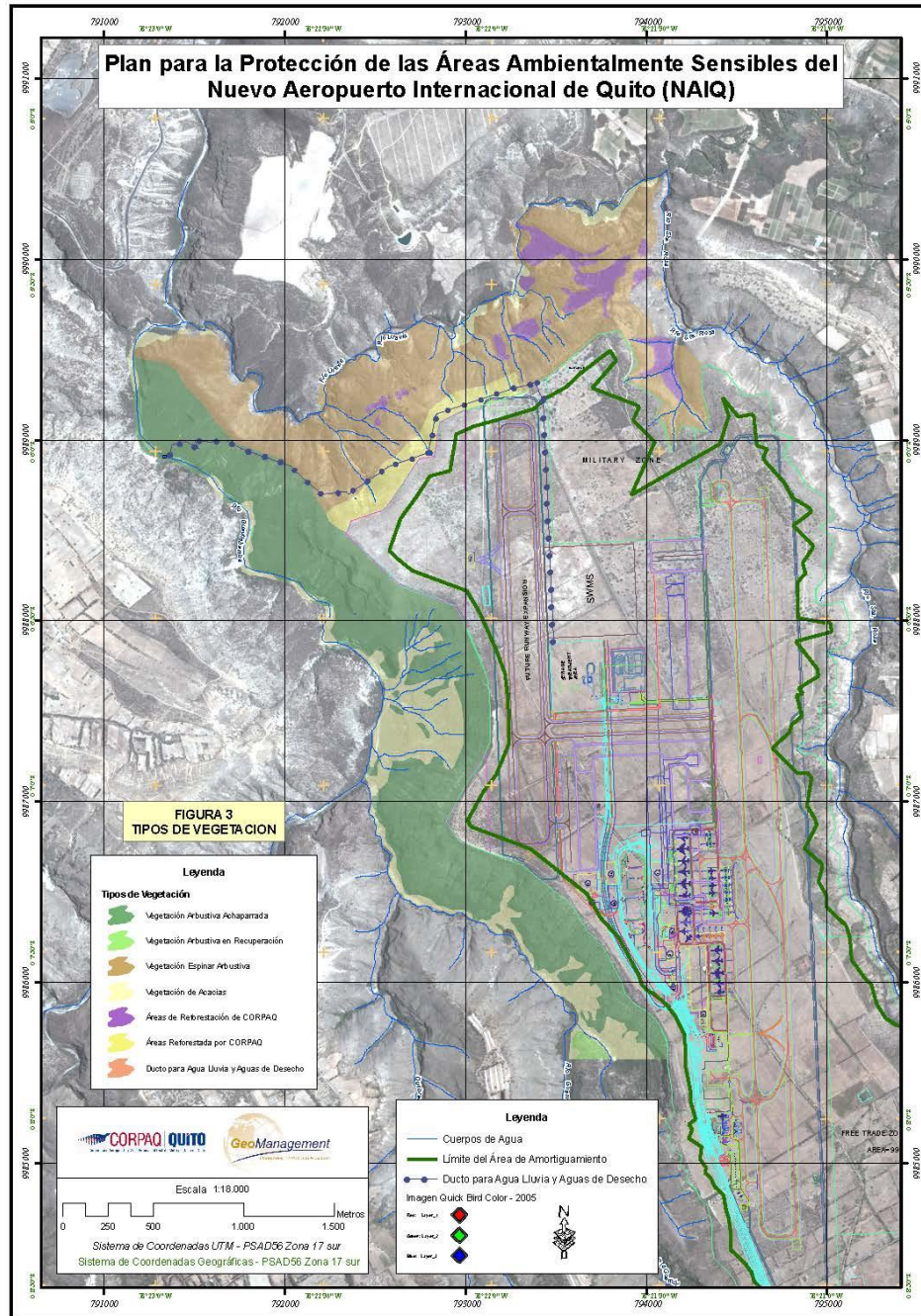


Figure 27. Types of vegetation, water bodies and buffer area
Source: Geo Management. Plan para la Protección de las Áreas Ambientalmente Sensibles del NAIQ. October, 2008.

²³ Francisco de la Torre. Actualización del estudio de Impacto Ambiental del Nuevo Aeropuerto de Quito, Informe Final. (April 2002)

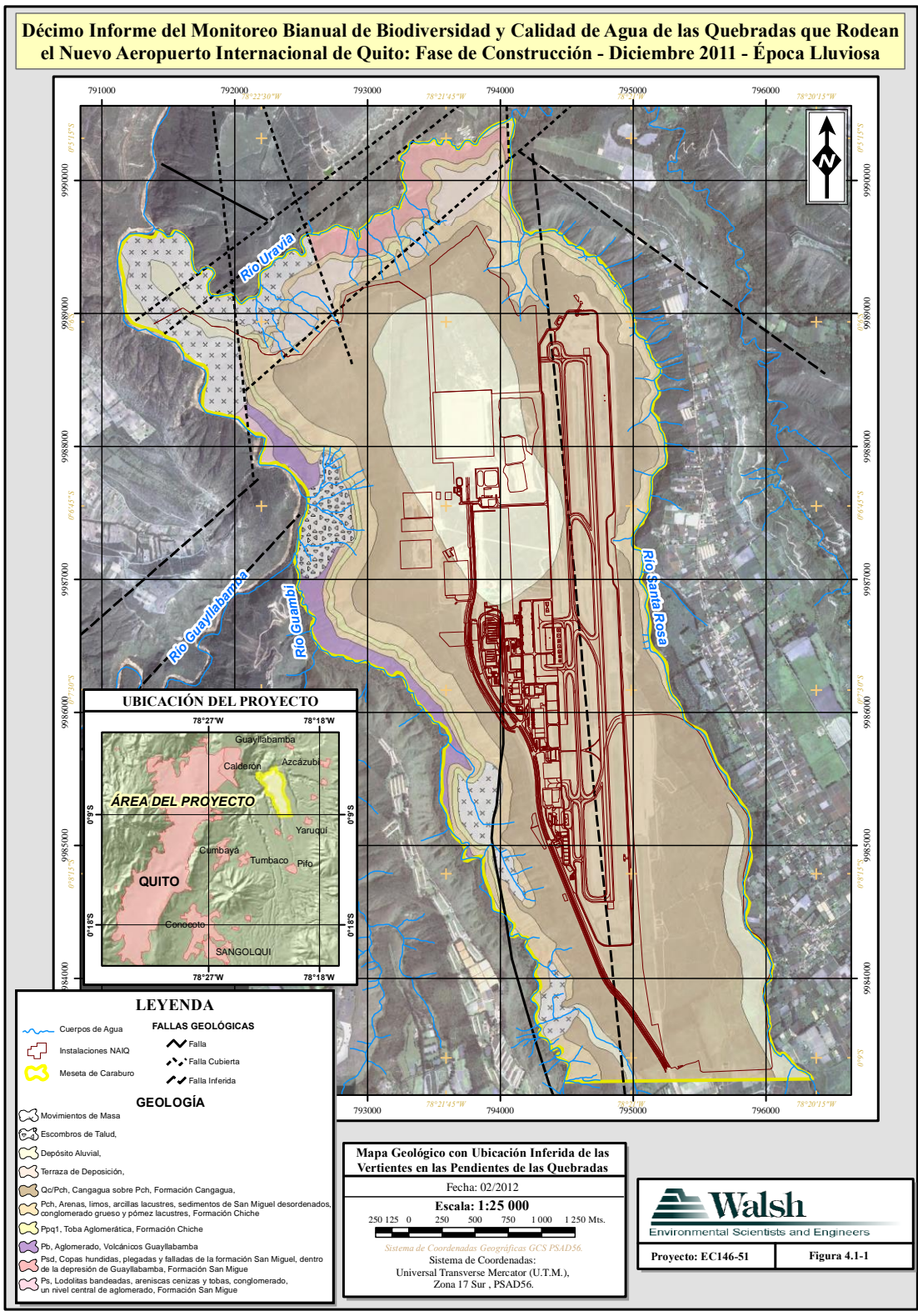


Figure 28. Geology and water bodies

Source: WALSH. Décimo Informe de Monitoreo Bianual de Biodiversidad y Calidad de Agua de las Quebradas que rodean el el NAIQ: Fase de Construcción, Epoca Lluviosa - Diciembre 2011. February 2012.

Cuadro No 15
Uso potencial

Tipos de Uso	Superficie (ha)	Porcentaje (%)
Agricultura sin limitaciones	991.78	66.12
Protección	508.22	33.88
Total	1.500.00	100.00

Figure 29. Table of potential use of the airport's land
Source: De la Torre, Francisco. Actualización del estudio de Impacto Ambiental del Nuevo Aeropuerto de Quito, Informe Final. Abril 2002

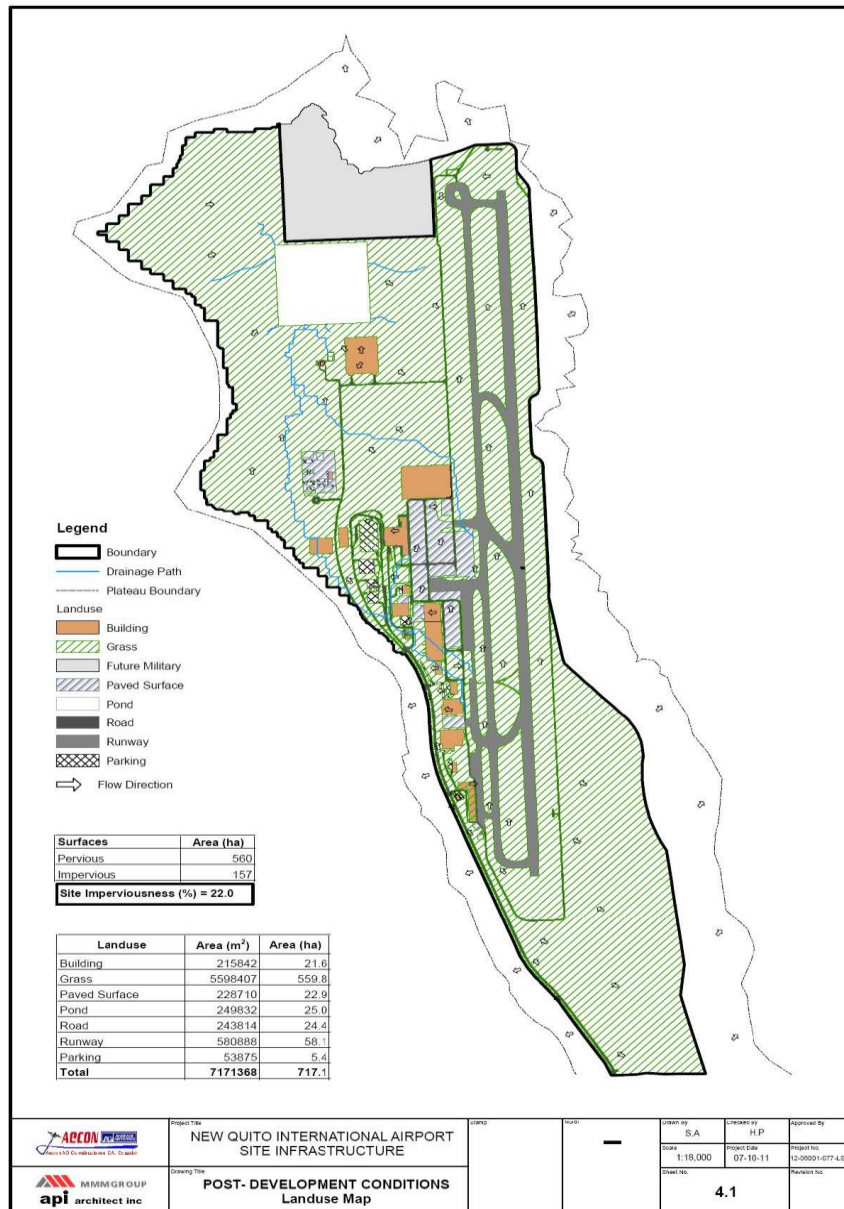


Figure 30. Post development land use map
Source: Plan de manejo integrado de aguas lluvias, residuales sanitarias e industriales Nuevo Aeropuerto Internacional de Quito, Version 4. Abril 2011

4.4.2. Land and Water:

In the **Land and Water subcategory**, out of three credits, one was evaluated as Restorative (NW 2.1 Manage Stormwater), one as Superior (NW 2.3 Prevent Surface and Groundwater Contamination), and one as Enhanced (NW 2.2 Reduce Pesticides and Fertilizer Impacts).

The project includes an Integrated Management Plan for stormwater and wastewater that is the blueprint for determining the physical characteristics as well as the operational and maintenance parameters of both systems. It coheres with local regulations and international regulations of OACI (Organización de Aviación Civil Internacional), includes a detailed program for monitoring and water quality assessment (including parameters, frequency, location, quality assurance / quality control), and makes reference to spill prevention, training mechanisms and community consultation.

The Stormwater Management System of the NQIA contains a System of Rainwater Harvesting that consists of open ditches, culverts, storm drains, a separate pool for Stormwater Management (which includes treatment), and a drainpipe to the Guayllabamba River. The collection system does not combine sanitary or industrial wastewater generated in the NQIA with stormwater. Stormwater management structures are designed to capture and repurpose more than 100% of on-site stormwater. At the same time, to ensure that contaminants are not introduced into any contaminated or non-contaminated waterways, the NQIA has incorporated a rainwater management system with appropriate water treatment into its design. Hydrological testing of the streams by the WALSH Company will help determine whether any negative effects of discharged runoff are realized.

Although in the documentation presented, there is no specific mention of the use of pesticides, it is noted that organic fertilizers are produced in a special on-site composting area and are used to fertilize the airport gardens. The organic fertilizer program was created to take advantage of waste generated from garden debris and vermicomposting. A series of activities are specified for the production of organic fertilizer and an area for recycling has been designated at the north end of the site.

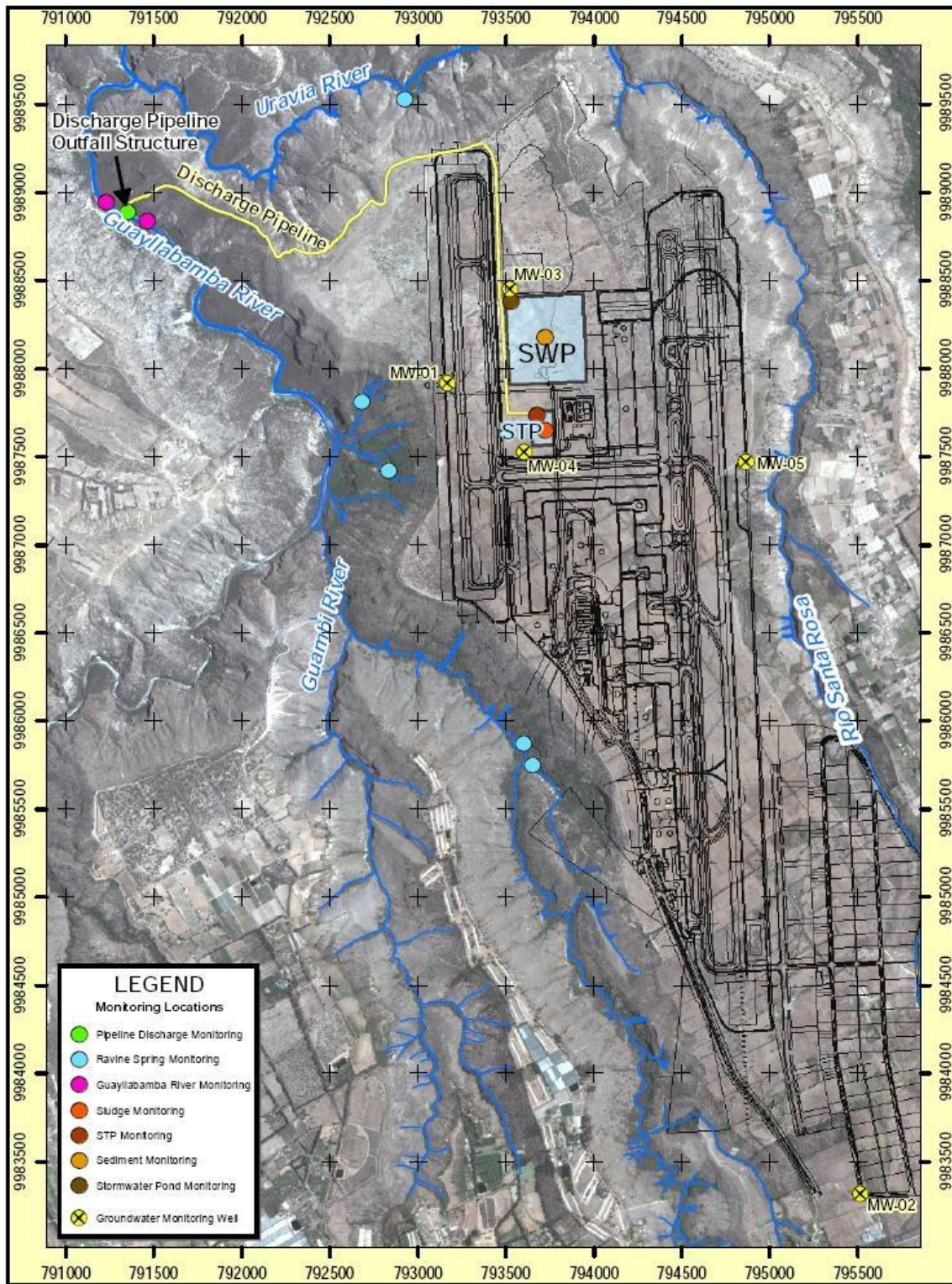


Figure 31. Stormwater drainage system and water monitoring stations

Source: Plan de manejo integrado de aguas lluvias, residuales sanitarias e industriales Nuevo Aeropuerto Internacional de Quito, Version 4, Abril 2011

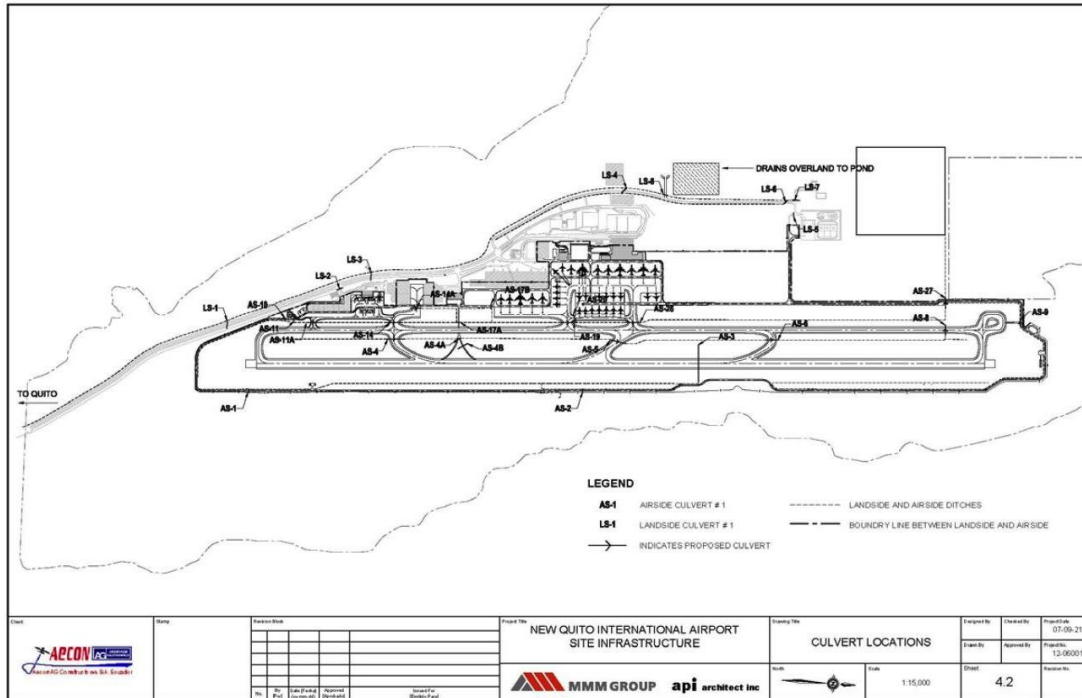


Figure 32. Drainage system infrastructure

Source: Plan de manejo integrado de aguas lluvias, residuales sanitarias e industriales Nuevo Aeropuerto Internacional de Quito, Version 4. Abril 2011

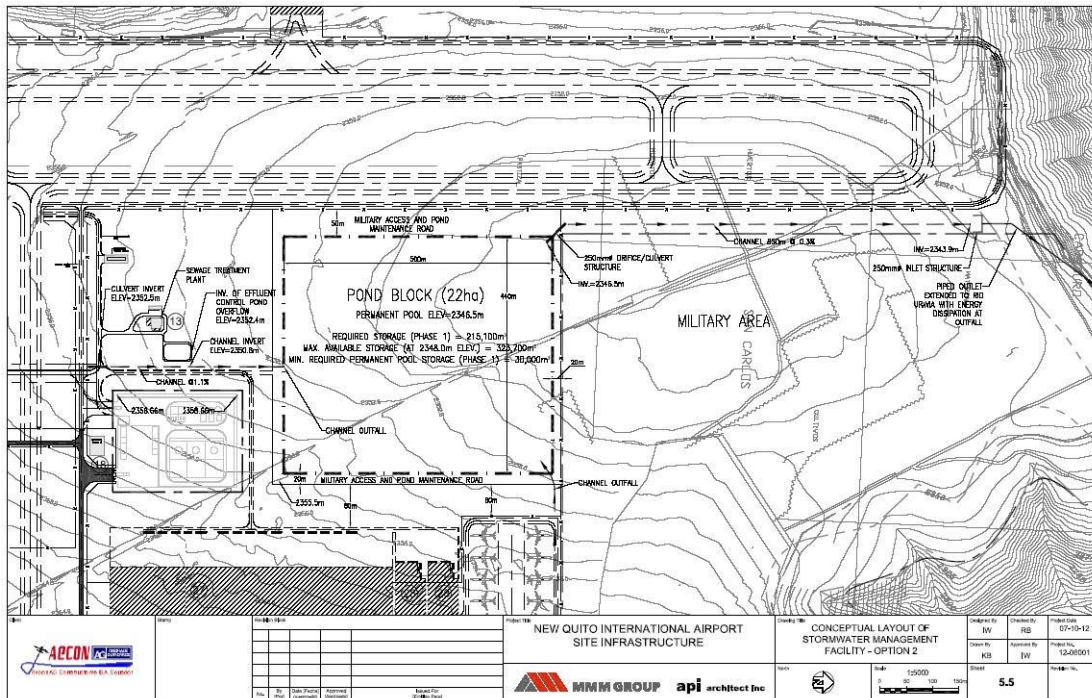


Figure 33. Pond location for stormwater accumulation and management

Source: Plan de manejo integrado de aguas lluvias, residuales sanitarias e industriales Nuevo Aeropuerto Internacional de Quito, Version 4. Abril 2011

4.4.3. Biodiversity:

In the **Biodiversity subcategory**, out of four credits, one was evaluated as Restorative (NW 3.2 Control Invasive Species), and three as Conserving (NW 3.1 Preserve Species Biodiversity, NW 3.3 Restore Disturbed Soils, and NW 3.4 Maintain Wetland and Surface Water Functions).

The operations of the NQIA generate noise impacts which may result in the displacement of some species of wildlife - mostly birds - to the existing streams around the plateau. Thus, conservation of the stream habitats is vital because these areas will likely provide refuge for certain displaced species.

The area proposed as Protected Forest has importance for conservation due to its geographical location, environmentally sensitive ecosystems, plants and animal species; however, less is known regarding the ecology and conservation of this area. In addition, a Plan of Protection and Rescue of Sensitive Wildlife has been proposed and implemented. The plan describes a series of activities and measures for the protection and recovery of sensitive wildlife and outlines strategies for mitigation of disturbed habitats, specifically in the case of the Burrowing owl. An Ecological Compensation Plan was implemented to restore individual *Acacia Macracantha* carob trees affected during the construction process of the NQIA. This was the only native tree species identified as dominant and representative of the Caraburo Plateau. In addition, according to the airport's Environmental Management Plan, stray dogs will be actively removed and discouraged from the area through the proper management of waste.

The project is concerned with the conservation of both surface water functions of stream systems located in the surrounding ravines and the drainage and groundwater systems in the area. Several studies have been done in order to maintain or enhance hydrologic connections, water quality, surrounding habitat areas, and to restore sediment transport. The location of the project both avoids infringement upon the natural water flows and restores disturbed functions to prior levels by including a wastewater treatment plant to treat and reuse water. In addition, an exhaustive water monitoring process was carried out during the construction and operation phases of the project to ensure that the project fully restores disturbed functions in the existing ecosystem.

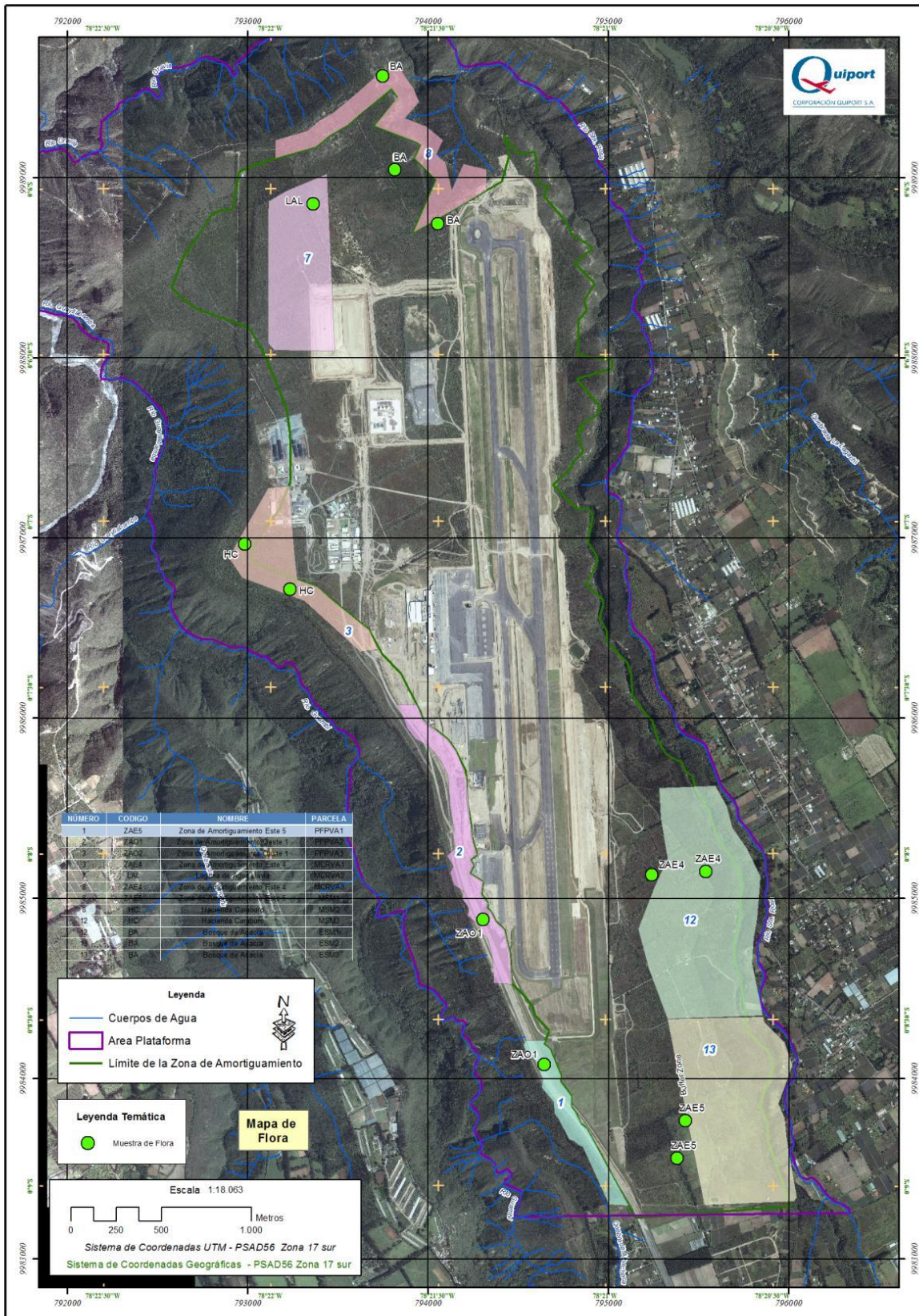


Figure 34. Location of the sampling sites established during the annual monitoring
Source: Corporación Quiport S.A. Informe Anual de Monitoreo Biológico Flora y Fauna Meseta de Caraburo 2011. Reporte Anual. Abril 2011 – Marzo 2012

4.4.5. Summary of results, Natural World category:

The table below (figure 35) shows the distribution of credits as well as the level of performance achieved in each credit:

NEW QUITO INTERNATIONAL AIRPORT, ECUADOR		PT.	Performance	% Total	max.	
35	SITING	NW1.1 Preserve Prime Habitat	14	Conserving	77.8%	18
36		NW1.2 Preserve Wetlands and Surface Water	14	Conserving	77.8%	18
37		NW1.3 Preserve Prime Farmland	0	No Score	0.0%	15
38		NW1.4 Avoid Adverse Geology	3	Superior	60.0%	5
39		NW1.5 Preserve Floodplain Functions	8	Superior	57.1%	14
40		NW1.6 Avoid Unsuitable Development on Steep Slopes	6	Conserving	100.0%	6
41		NW1.7 Preserve Greenfields	0	No Score	0.0%	23
42	L & W	NW2.1 Manage Stormwater	21	Restorative	100.0%	21
43		NW2.2 Reduce Pesticides and Fertilizer Impacts	2	Enhanced	22.2%	9
44		NW2.3 Prevent Surface and Groundwater Contamination	9	Superior	50.0%	18
45	BIODIVERSITY	NW3.1 Preserve Species Biodiversity	13	Conserving	81.3%	16
46		NW3.2 Control Invasive Species	11	Restorative	100.0%	11
47		NW3.3 Restore Disturbed Soils	8	Conserving	80.0%	10
48		NW3.4 Maintain Wetland and Surface Water Functions	15	Conserving	78.9%	19
		NW0.0 Innovate or Exceed Credit Requirements	0	N/A		
		NW	124		61.1%	203

Figure 35: Summary of results in the Natural World category

The project performs very well in the **Natural World category**, but there are opportunities for project improvement in the Siting subcategory. Considering all credits and the maximum possible values for each indicator, the percentage of achievement equates to 61.1%, or 124 points out of 203.

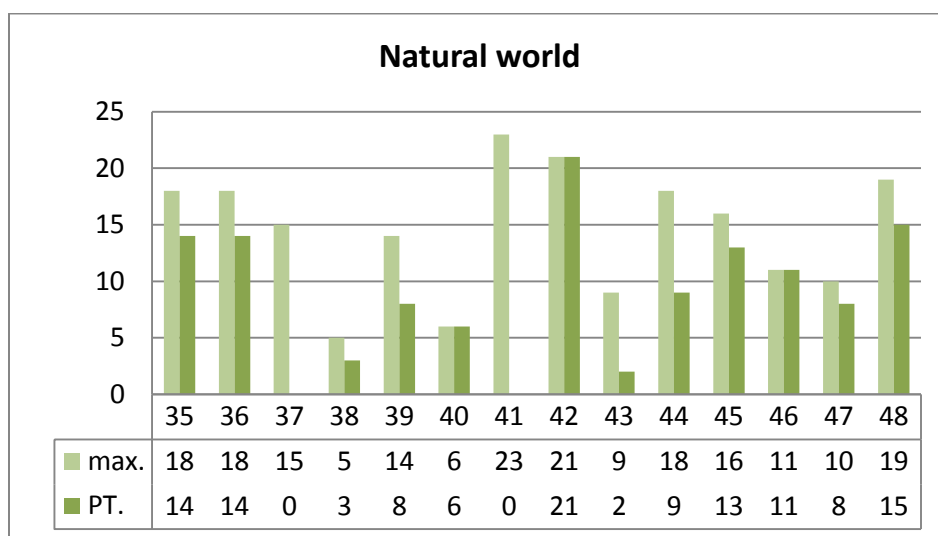


Figure 36: Summary of results in the Natural World category

4.5 CLIMATE AND RISK

Envision’s Climate and Risk category is divided into two main sub-categories, emissions and resilience. The main goals of the category are to “minimize emissions that may contribute to increased short and long-term risks” and “to ensure infrastructure projects are resilient to short-term hazards or long-term altered future conditions.”²⁴ The credits are distributed as: Emissions (CR 1.1, CR 1.2), and Resilience (CR 2.1, CR 2.2, CR 2.3, CR 2.4, CR 2.5).

CREDIT SCORING

			IMPROVED	ENHANCED	SUPERIOR	CONSERVING	RESTORATIVE	
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	

Figure 37: Natural World category, credits distribution.

4.5.1 Emissions

In the **Emissions subcategory**, both credits were evaluated as Improved (CR 1.1 Reduce Greenhouse Gas Emissions and CR 1.2 Reduce Air Pollutant Emissions).

Aircraft are the largest contributor to emissions of all common air contaminants, contributing 82% to 96% of all airport emissions.²⁵ The modeling for 2020 and 2030 shows an increase in concentrations that is essentially based on a predicted increase in air traffic. The modeling assumes that some improvements in emissions are made as older aircraft are replaced with newer aircraft; however, it is not possible to predict the specific changes that may occur in 10 or 20 years, so the approach taken focuses on a worst-case scenario. The studies conducted establish a comprehensive life cycle carbon assessment, considering a period of 30 years, but no specific actions or strategies are suggested to reduce the anticipated amount of greenhouse gas emissions. It is recommended that the project use the data already gathered to implement future actions to reduce CO₂.

The following air pollutants were considered in the NQIA air quality assessment: Carbon Monoxide (CO), Volatile Organic Compounds (VOCs), Oxides Of Nitrogen (NOx), Sulfur Dioxide (SO₂), and Particulate Matter (PM). The results of the modeling determine future scenarios in which the level of Nitrogen Oxide (NOx) exceeds the limits established by Ecuadorian Air Quality standards. In order to minimize the polluting impact, Quitport SA developed a Strategy for Reducing Emissions of Nitrogen Oxides (NOx) for the NQIA which provides realistic mitigation measures and strategies. Is relevant to mention that the background air quality concentrations at the proposed airport will be lower than at the existing airport, which is within an urban setting. Aircraft efficiency is greatly improved at the proposed location due to

²⁴ Envision Guidance Manual, p.150

²⁵ RBDI Consulting engineers and scientists. Air Quality Assessment of the New International Quito Airport in Ecuador. January 26, 2009. pp 52.

the lower elevation, which will translate into fewer emissions per unit of takeoff weight than at the existing airport. Thus, assuming an equal tonnage of air traffic and associated road traffic, the overall air quality in the vicinity of the proposed airport will be better than the air quality around the existing airport.

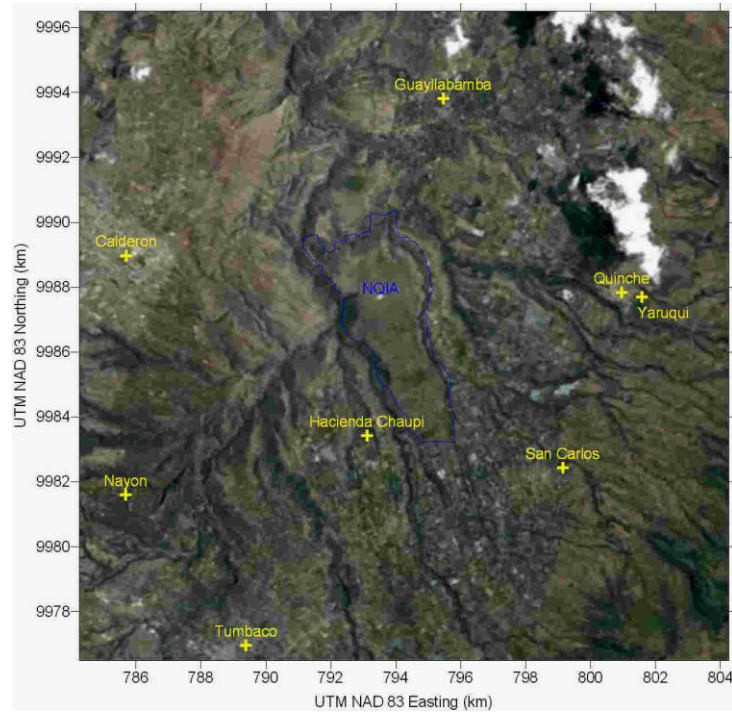


Figure 38: Topography and Geography of 20 x 20 km Study Area
 Source: RWDI Consulting engineers and scientists. Air Quality Assessment of the New International Quito Airport in Ecuador. January 26, 2009. Pp 2

Table 1-1: Relevant Ambient Air Quality Objectives for NQIA

Pollutant	Averaging Period	Objective ($\mu\text{g}/\text{m}^3$)	
		CTA	Ecuador
CO	1-Hour	40,000 ^(a)	40,000 ^(a)
	8-Hour	10,000	10,000 ^(a)
NO _x	1-Hour	320 ^(a)	-
	24-Hour	150	150 ^(b)
	Annual	100	100
SO ₂	24-Hour	-	350 ^(a)
	Annual	-	80
PM ₁₀	24-Hour	150	150 ^(b)
	Annual	50	50
PM _{2.5}	24-Hour	-	65 ^(b)
	Annual	-	15

Notes: (a) Not to be exceeded more than once a year. (b) Not to be exceeded more than twice a year.

Figure 39: Relevant Ambient Air Quality Objectives for NQIA
 Source: RWDI Consulting engineers and scientists. Air Quality Assessment of the New International Quito Airport in Ecuador. January 26, 2009. Pp 2

4.5.2 Resilience

In the **Resilience subcategory**, out of five credits, one was evaluated as Superior (CR 2.4 Prepare for Short-Term Hazards), and the remaining four received No Score (CR 2.1 Assess Climate Threat, CR 2.2 Avoid Traps and Vulnerabilities, CR 2.3 Prepare for Long-Term Adaptability, and CR 2.5 Manage Heat Island Effects).

Short-term risks are properly considered and identified for all phases of the project, but long-term risks such as climate change are only partly identified and addressed over the lifespan the project. Regarding short-term risks, the project is located in a seismic hazard area. Therefore, the airport structure has been designed to resist seismic activity and minor damages caused by an earthquake of Ms> 7 with a 475-year rate of return. Design considerations are complemented by evacuation routes and emergency protocols. Other short-term risks include fires, explosions, accidental spills, transit accidents, and labor accidents. Plans and protocols are established to respond to each of these events. To avoid flooding and landslides, an integrated water collection system was designed. However, considering recurrent weather phenomena such as *El Niño*, which can generate very high rainfall in areas of low average precipitation, the water collection system should be augmented in the future.

In consideration of the imminent threat of climate change and extreme weather conditions around the world, better preparedness to confront long-term risks should be considered in the design of any project. This is specifically relevant in the case of airports and other infrastructure projects that play an important role in communication and disaster relief. No information was provided regarding a climate impact assessment or adaptation plan that identifies climate change risks and possible responses for the NQIA. Such a plan should consider risks and possible changes in operating conditions and should outline strategies for recovery. Strategies to manage long-term changes may include: structural changes to expand the range of conditions in which the system can function, decentralized systems, natural systems, alternative supply options, adaptive capabilities, and site selection.

4.5.3 Summary of results Climate and Risk category.

The table below (figure 40) shows the distribution of credits as well as the level of performance achieved in each credit:

NEW QUITO INTERNATIONAL AIRPORT, ECUADOR			PT.	Performance	% Total	max.
49	EMISSION	CR1.1 Reduce Greenhouse Gas Emissions	4	Improved	16.0%	25
50		CR1.2 Reduce Air Pollutant Emissions	2	Improved	13.3%	15
51	RESILENCE	CR2.1 Assess Climate Threat	0	No Score	0.0%	15
52		CR2.2 Avoid Traps And Vulnerabilities	0	No Score	0.0%	20
53		CR2.3 Prepare For Long-Term Adaptability	0	No Score	0.0%	20
54		CR2.4 Prepare For Short-Term Hazards	10	Superior	47.6%	21
55		CR2.5 Manage Heat Island Effects	0	No Score	0.0%	6
CR0.0 Innovate Or Exceed Credit Requirements			0	N/A		
CR			16		13.1%	122

Figure 40: Summary of findings in the Climate & Risk category

In the **Climate and Risk category**, the biggest opportunities for project improvement are in the Resilience subcategory. Considering all credits and the maximum possible values for each indicator, the percentage of achievement equates to 13.1%, or 16 points out of 122.

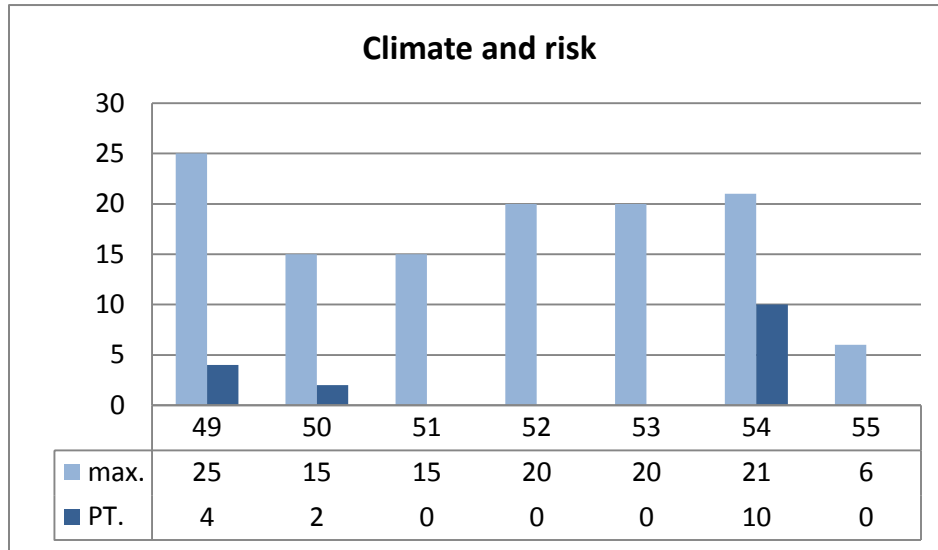


Figure 41: Summary of results in the Climate & Risk category

5. RESULTS AND CONCLUSION

The evaluation of the New Quito International Airport (NQIA) is an opportunity to analyze a sustainable infrastructure project that contributes to the overall development of Ecuador's economy. The analysis recognizes both the strengths and vulnerabilities of the project and points out recommendations that could be used to achieve better standards in the future stages of the airport's expansion.

In the **Quality of Life category**, the project obtained 68 out of 181 points, or 37.6%. This is the third best performance by the New Quito International Airport project out of the five categories of the *Envision* rating system. The project improved quality of life through the generation of employment and targeted investments for the communities located among the six parishes in the project's area of influence. In addition, emphasis was placed on hiring local individuals and companies, and on providing the necessary training to comply with the legal and technical requirements to meet the project's high standards.

Since the beginning, the project has had impacts on the health and quality of life of nearby communities. As a result, a comprehensive Social Management Plan was implemented. This plan includes ongoing public consultations and participation by all the communities affected by the project, as well as continuous monitoring to measure negative and positive impacts. Policies and procedures were established to maintain safe and healthy work environments, and to minimize the risks to which workers are exposed. In regards to impacts inherent to airport operations, such as noise and light pollution, the NQIA performs periodic monitoring to ensure that noise levels do not exceed maximum allowable values. Efforts to minimize light pollution present an opportunity for project improvement in the near future that would reduce excessive glare while conserving energy.

In the **Leadership category**, the project obtained 53 out of 121 points, or 43.8%, which was the second best performance for the project out of the five categories. The project team takes a systematic approach to project development. This approach requires the phases of the project to be managed through collaborations between a broad set of stakeholders and a multidisciplinary team, and has the objective of optimizing the project's overall performance. To this end, a Public Consultation and Disclosure Plan (PCDP) has been implemented to ensure that adequate information has been provided to protect and include affected people and other stakeholders in the process. Moreover, these groups have been able to raise their concerns in time for measures to be incorporated into the project design.

With regard to long-term monitoring, different plans have been established that include objectives, actions, and measurements. To guarantee implementation, funds and responsibilities have been assigned and specific people and organizations have been designated to monitor and maintain the different programs included in the project. Finally, the pursuit of by-product synergy opportunities provides a clear opportunity for the project to improve its sustainability performance in future phases of expansion.

In the **Resource Allocation category**, the project obtained 38 of 182 points, or 20.9%. This performance ranked fourth among the five categories for the NQIA in the *Envision* rating system, and was largely due to a lack of information. While any subcontractor who signs a contract with Quitport Corporation must accept the environmental standards established in the Environmental Management Plan, no specific data was provided about supplier performance regarding materials and sustainable procurements. Even though the project was constructed with minimal earth removal from the site, it is unknown what

percentage of materials brought to the site were purchased from suppliers that follow sustainable practices. During the project's operation, a Comprehensive Waste Management Plan will be implemented that includes a waste classification system for the collection, disposition and management of all the solid residues produced by airport operations. It is estimated that 50% of the total amount of waste generated is recycled or reused, and 50% is disposed in authorized landfills.

The project includes internal monitoring of the energy systems and continuous training programs for maintenance personnel to ensure efficient functioning of all operating systems. However, no measures to reduce energy consumption during the operation and maintenance phases have been implemented at the NQIA, and therefore no data or materials for analysis are available. Reduction of energy consumption could be part of future improvements to the NQIA. Regarding water consumption, even though the project includes general considerations and strategies to optimize the use of freshwater resources, the documentation provided does not contain specific data about the amount of water consumed and the reduction of non-replenishable potable water use.

In the **Natural World category**, the project obtained 124 out of 203 points. This represents 61.1%, and is the project's best performance within any of the five categories of the *Envision* rating system. The project is located in an area assessed as not being of high ecological value, but is surrounded by a valuable natural fragile ecosystem of ravines and forests. As such, the project includes a plan to legally designate this area as "Protected Forest", and a Plan of Protection and Rescue of Sensitive Wildlife has been implemented in the area that outlines strategies for mitigation and preservation of sensitive wildlife.

Furthermore, the project includes a 155.5 ha buffer area to prevent impacts generated by project activities on protected areas and to preserve existing water bodies. To maintain and enhance the surrounding habitat, the project includes land use strategies, permanent monitoring programs of water and wildlife, and a native species reforestation program. The location of the project both avoids infringement upon the natural water flows and restores disturbed functions to prior levels by including a wastewater treatment plant to treat and reuse water. Also, stormwater management structures have been designed to capture and repurpose more than 100% of on-site stormwater. The collection system does not combine sanitary or industrial wastewater with stormwater, and to ensure that contaminants are not introduced into any waterways, the NQIA has incorporated a rainwater management system with appropriate water treatment.

In the **Climate and Risk category**, the project obtained 16 out of 122 points, or 13.1%, which was the worst performance the NQIA had in any category.

Aircraft are the largest contributor to emissions of all common air contaminants; therefore, studies and modeling for a 30-year period were conducted to establish a plan with mitigation measures and strategies to minimize the polluting impact of the NQIA. In addition, the project's site contributes to a reduction in air pollution as compared with the old airport, because aircraft efficiency is greatly improved due to the lower elevation. Air quality assessments based on existing data represent an opportunity for future actions or strategies to reduce the anticipated amount of greenhouse gas emissions.

The biggest opportunities for project improvement are within the Resilience subcategory and consist of an assessment of climatic threats and the creation of a long-term adaptability plan. Short-term risks are

properly considered and identified for all phases of the project, and include fires, explosions, accidental spills, transit accidents, labor accidents, flooding, landslides, and seismic hazards. The infrastructure was designed considering these risks, and protocols were established to respond to each of these events. However, regarding long-term risks, better preparedness to confront climate change and extreme weather events should be considered in the design of any project. This is specifically relevant in the case of airports and other infrastructure projects that play an important role in communication and disaster relief.

The graphs below demonstrate the project’s performance under the three Infrastructure 360° Awards. The **People and Leadership Award** (figure 42) represents the QL and LD categories from the Envision™ Rating System. The project received a score of 121 points out of a total of 302 combined points within these categories, which equates to a 40.07% level of achievement. The **Climate and Environment Award** (figure 43) represents the RA, NW and CR categories within the Envision™ Rating System. The project received a score of 178 points out of a total of 507 combined points within these categories, which equates to a 35.11 % level of achievement. Thus, the overall achievement of the New Quito International Airport project under the **Infrastructure 360 Award** (figure 44) is 299 out of 809 points, or 37 % of the total score.

This report evaluates the sustainability performance of NQIA 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.

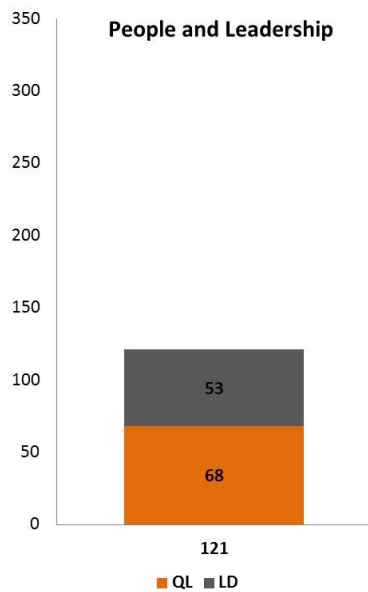


Figure 42: People and Leadership.

Score distribution

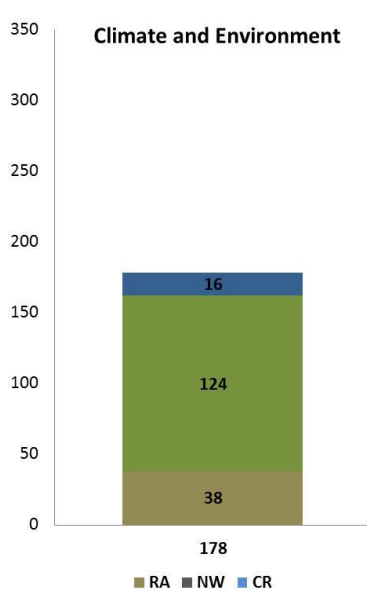


Figure 43: Climate and Environmental.

Score distribution

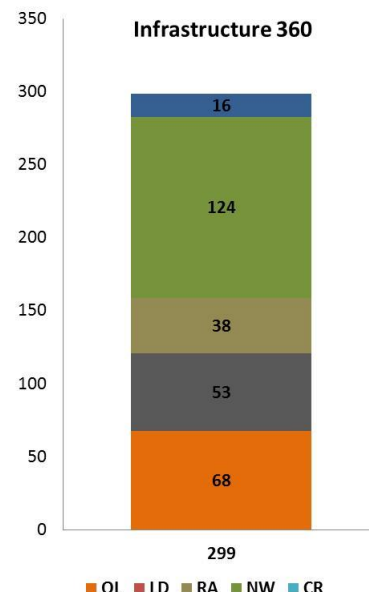


Figure 44: Infrastructure 360.

Score distribution



Figure 47 and 48 Airport Images

Source: El Nuevo Aeropuerto – Foto reportaje por Chris Chalk; September 2013



Figure 49 and 50 Airport Images
Source: El Nuevo Aeropuerto – Foto reportaje por Chris Chalk; September 2013



Figure 51 and 52 Airport Images

Source: El Nuevo Aeropuerto – Foto reportaje por Chris Chalk; September 2013



Figure 53 and 54 Airport Images

Source: El Nuevo Aeropuerto – Foto reportaje por Chris Chalk; September 2013



Figure 55 to 60 Wildlife Monitoring

Source: Corporación Quiport S.A. Informe Anual del Monitoreo Biológico en la Plataforma del Nuevo Aeropuerto Internacional de Quito - 2011. April 2011 – March 2012



Figure 61 to 68 Vegetation Monitoring

Source: Corporación Quiport S.A. Informe Anual del Monitoreo Biológico en la Plataforma del Nuevo Aeropuerto Internacional de Quito - 2011. April 2011 – March 2012



Figure 69 to 74 Vegetation Monitoring

Source: Corporación Quiport S.A. Informe Anual del Monitoreo Biológico en la Plataforma del Nuevo Aeropuerto Internacional de Quito - 2011. April 2011 – March 2012



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		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		MANAGEMENT	LD1.4 Provide for stakeholder involvement	1	5	9	14		
17			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			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			CR2.1 Assess climate threat				15		
52		RESILIENCE	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		
			Maximum points possible:				803		

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

803

APPENDIX C: CREDIT DETAILS

CATEGORY I, PEOPLE AND LEADERSHIP (PL)			
SUB CATEGORY: QUALITY OF LIFE			
	NEW QUITO INTERNATIONAL AIRPORT, ECUADOR	RECOMMENDATIONS	
<p>PL1.1 Improve Community Quality of Life</p>	<p>20</p>	<p>*Periodic update of the Social Management Plan according to community needs</p> <p>*Minutes of meetings letters and memoranda with key stakeholders, community leaders and decision- makers for obtaining input and agreement regarding the impact assessment and planned actions.</p> <p>* Expand the Social Investment Plan to achieve the overall community rehabilitation</p>	
			<p>Conserving</p> <p>This section particularly focuses on assessing whether infrastructure projects are in line with community needs and improve quality of life while minimizing negative impacts. Quitport’s primary social principle is to offer a service to the community that is inspired by ‘good neighbor’ and responsible social practices. One of the most important aspects of this is the ability to offer sustained and necessary collaboration with the neighboring communities in order to improve local capacity and quality of life, and to reaffirm cultural, social and historical values.</p> <p>Quitport has implemented a comprehensive Social Management Plan that includes continuous public consultation and participation with all the communities affected by the project, as well as permanent monitoring to measure negative and positive impacts. The following actors and groups have been identified as impacted by construction phase of the NQIA: local authorities; the airport contractors; Ecuadorian and international investors; leaders of the parish councils; and the populations of Puenbo, Tababela, Pifo, Yaruquí, Checa and El Quinche. Quitport currently employs continuous open communication with these interest groups.</p> <p>Complementing this plan is a Social Investment Plan that provides targeted and transparent investments with beneficial impacts to the populations of the six neighboring parishes. In order to foster a positive, yet non-dependent, relationship between the airport and local residents, the plan identifies feasible opportunities for joint local projects such as: preservation of historical sites; technical workshops in local parishes; employment training; donations of materials and manpower (e.g. for small school improvement projects); and sponsorship of local sports and social groups. Furthermore, the company generates employment in the area.</p>
			<p><u>Source:</u></p> <p>Quiport. The Social Management Plan For The New Quito International Airport. September, 2006. Cap. 5 pp: 13 a 15 // ADAMA assessment. Auditoria Social Externa 2011 - 2012. Aeropuerto Internacional Mariscal Sucre & Nuevo Aeropuerto Internacional De Quito. Septiembre 10, 2012. Cap 8 pp 26 - 47 // WALSH. Plan de Relaciones Comunitarias. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito. Mayo 2011. pp 30 - 36 // Quiport. Social Investment Plan. pp 3 - 6. Cap 7. pp 4 - 6. Anexo 1 pp 11 a 16 // Quiport. Plan de Monitoreo Social NQIA. pp 2 - 9, Anexo 2 pp 10 - 11. Cap. 7 pp 4 - 6.</p>

<p>PL1.2 Stimulate Sustainable Growth & Development</p>	<p>13</p>	<p>Conserving</p> <p>The NQIA makes a significant contribution to the region’s development and promotes employment of residents in the surrounding communities. Even though the economy of Ecuador is highly dependent on exports of raw materials and oil, like most Latin American countries, other sectors such as tourism, agriculture, and product exports are growing. Distribution of these products partially relies on a good international network of air transportation.</p> <p>Throughout the process of growth and development, one of the main goals of the NQIA has been to align community needs with project requirements. To this end, the Social Management Plan includes employment training and investments to improve the overall livability of the surrounding parishes. Socioeconomic conditions of the communities closest to the project have been positively affected by the presence of new businesses and industries linked to airport activities. The NQIA has strengthened both individual and collective capacities for gainful employment by the project through providing adequate technical training, integrating local communities, and identifying and investing in existing physical and social community assets.</p> <p>In addition, an NQIA Social Monitoring Plan provides both internal and external parameters with which to measure and evaluate the impacts of activities and to implement a continuous process of improvement in the level of results.</p>	<p>*Analyses showing the effects of the delivered work on local productivity. Reduce congestion, increased operation capacity.</p> <p>* Identify existing community assets for restoration. Improve attractiveness through restoration of existing infrastructure: physical, knowledge and social assets.</p>
		<p><u>Source:</u> ADAMA assessment. Auditoria Social Externa 2011 - 2012. Aeropuerto Internacional Mariscal Sucre & Nuevo Aeropuerto Internacional De Quito. Septiembre 10, 2012. Cap 6. Cap: 7, pp 89 - 99 // Quiport. The Social Management Plan For The New Quito International Airport. September, 2006. pp. 3 - 6. Cap 5 (pp 13 – 16). Anexo 1 (pp 9 – 11). Anexo 2 (pp 12 -16). Cap 7 (pp 4 – 6). Cap 10 (pp 10 – 14) // Quiport. Social Investment Plan. pp 9 -11, Anexo 2 (pp 12 – 16) // Quiport. Plan de Monitoreo Social NQIA. pp 3 - 9. Anexo 2 (pp 10 – 11) // Aecon AG Constructores. PS NQIA 63. Proyecto NQIA. Proceso: Relaciones con la comunidad.</p>	

<p>PL1.3 Develop Local Skills and Capabilities</p>	<p>12</p> <p>Conserving</p> <p>The airport has placed emphasis on hiring local individuals and companies in the construction and operation phases, and on providing the necessary training to comply with the legal and technical requirements of the project.</p> <p>In the construction phase, hiring of local labor from within the project’s direct area of influence averaged 31.81% in 2011 and 35.26% in the first half of 2012. It should be noted that these percentages are indirectly proportional to the total monthly workers as the higher the total number of workers, the lower the percentage of local labor from the area of direct influence. From the beginning of construction in 2006 until the present, the NQIA Social Management Plan has implemented training and entrepreneurship programs. The Community Training Plan aims to improve individual, community and new business capacities in light of new local socio-economic dynamics.</p> <p>Two educational programs have been implemented. The Virtual Classroom program allows the installation of a classroom via a broadband internet connection in a school or educational center in each of the six parishes. The program’s objective is to train teachers to use, maintain and manage the program, in order for it to be self-sustaining in the long-term. The Employment Training program aims to create a permanent space for job training for area inhabitants. During the construction and operation phases of the NQIA, trained, qualified labor is required. The program will provide training courses that meet NQIA’s labor demands and ensure employment in the long-term.</p> <p><u>Source:</u> Quiport. The Social Management Plan For The New Quito International Airport. September, 2006. Cap: 10 // Aecon AG Constructores S.A. PS NQIA 63. Proyecto NQIA. Proceso: Relaciones con la comunidad // Quiport. Social Investment Plan. Cap: 10, Anexo 1 y 2, pp 9 -11 // ADAMA assessment. Auditoria Social Externa 2011 - 2012. Aeropuerto Internacional Mariscal Sucre & Nuevo Aeropuerto Internacional De Quito. Septiembre 10, 2012. Cap: 7 pp 96 - 97 // WALSH. Plan de Inversión Social y Compensación con la Comunidad del Área de Influencia. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito. Mayo 2011. pp 33-34 // Corporación Quiport S.A. Base de Datos Laboral.</p>	<p>*Fulfill commitments for hiring local workers, including disadvantages groups, or disabled people.</p> <p>* Hiring and educational programs emphasis shifts from local capacity development to community competitiveness.</p>
<p>PL2.1 Enhance Public Health And Safety</p>	<p>2</p> <p>Improved</p> <p>The health and safety programs of the NQIA aim to maintain or improve the overall physical and mental health of the entire project staff, in accordance with pertinent regulations established by the Ecuadorian Social Security Institute (IESS). Documentation provided shows that policies and procedures were established to maintain safe and healthy work environments, to ensure the integrity of all people involved in the project, and to minimize the risks to which workers are exposed. For identified Industrial Safety risks, a group of prevention and control standards were implemented in every workplace according to a set of internal regulations approved by the Departments of Environment, Safety and Occupation, and Health of Ecuador.</p>	<p>* Systematically document significant risks identified, changes instituted and appropriated sign-offs received.</p> <p>* Include a systematic identification and assessment of any new or non-standard technologies, materials and methodologies used by the project.</p>

		<p>During the construction and operation phases, the standards followed by the airport for industrial safety and occupational health exceeded local requirements. The NQIA applied the safety and health guidelines of the World Bank, International Finance Corporation (IFC) & the Occupational Safety & Health Administration (OSHA).</p> <p><u>Source:</u> WALSH. Plan de Seguridad Industrial y Salud Ocupacional. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito. Mayo 2011. pp 20-23 // Quiport. Manual De Salud Y Seguridad Nuevo Aeropuerto De Quito. Diciembre, 2011 // AECON AG Constructores S.A. Procedimientos Operacionales Seguridad y Salud. PS NQIA 04; PS NQIA 09; PS NQIA 10; PS NQIA12; PS NQIA17; PS NQIA22.</p>	
<p>PL2.2 Minimize Noise And Vibration</p>	<p>8</p>	<p>Conserving</p> <p>As anticipated, the airport disturbs adjacent communities with noise and light pollution. The noise peaks occur mainly during take-off, landing, and performing engine run-ups. These impacts are inherent to the operation of an airport, yet periodic monitoring should ensure that noise levels do not exceed maximum allowable values. The project team has completed all studies required by both Ecuadorian law and by international entities involved in the project's financing, including those that govern aviation. According to the noise and vibration studies, the design team considered sound-absorbing mitigation measures in certain areas to minimize negative impacts to workers and communities for all three phases of the project. As the phases of airport progress, the fleet mix will change and older aircraft will be replaced by newer (and generally quieter) planes. However, this may be offset by an expected increase in the number of flights. The studies also provide recommendations to assist the local government in efforts to plan compatible future land uses when developing the areas surrounding the airport.</p> <p><u>Source:</u> Quiport. Update Of The Land Use Proposal For The 65-Decibel Zone Of The New Quito International Airport. January 2009 // RWDI Air Inc. New Quito International Airport Air Traffic Noise Impact Assessment Phase I – Current Fleet Mix Quito, Ecuador. November 21, 2008 // Cardno Entrix. Actualización del Plan de Manejo Ambiental para el Nuevo Aeropuerto Internacional de Quito. Julio, 2012 // De La Torre, Francisco. Actualización del estudio de Impacto Ambiental del Nuevo Aeropuerto de Quito. Abril 2002 // WALSH. Plan De Manejo Ambiental – Fase De Operaciones // WALSH. Plan de Prevención y Mitigación de Impactos. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito. Mayo 2011.</p>	<p>*Analyze the documentation that estimates the levels of ambient noise and vibration and contrast those, to community needs or goals for livability.</p> <p>*Monitor of the implementation process for the measures proposed</p>
		<p>No Score</p> <p>In terms of lighting, the main factor considered for the NQIA project and for any airport is safety. An adequate lighting system is defined according to Ecuadorian norms and specific international regulations for airports. However, the minimization of light pollution and excessive glare would help the airport conserve energy and can be considered in the future. To this end, a lighting needs assessment would determine appropriate lighting levels for the project, as well as alternative strategies for energy efficiency that could be applied. These may include automatic turn-off systems and non-lighting alternatives.</p> <p><u>Source:</u> Not provided</p>	<p>*Use of light barriers, through the use of high barriers, trees, shrubs to reduce light spillage in case of affection to any specific area.</p> <p>* Establish lighting zones and removed unneeded lighting in accordance with established lighting zones</p>
<p>PL2.3 Minimize Light Pollution</p>	<p>0</p>		

<p>QL2.4 Improve Community Mobility And Access</p>	<p>1</p> <p>Improved</p> <p>The configuration of Quito along a north/south axis and the specific geographic conditions of the area have limited the development of a proper road system. In addition, the unplanned growth of vehicular use has resulted in chaotic and congested traffic patterns, which are further exacerbated by the barrier that the old airport created in the northern part of the city.</p> <p>The decision to locate the NQIA 18 km outside of the city responds to the problem of congestion in Quito, but also promotes urban sprawl and the use of personal vehicles and buses instead of other less-polluting transportation modes.</p> <p>The Metropolitan Director of the Environment approved an Environmental License for CORPAQ to construct the airport in December 2005. Considering the impact of the project and the need for better accessibility, the License required the construction of other infrastructure such as the Alpachaca corridor, which is the only connection between the airport and Quito. However, many gaps exist and the connection between the airport and the city should be improved in the near future. Additional infrastructure such as the Ruta Collas Highway, which is anticipated to be finished by 2013, or integration of other modes of transportation, would help reduce traffic congestion and commute times.</p> <p><u>Source:</u> Cardno Entrix. Actualización del Plan de Manejo Ambiental para el Nuevo Aeropuerto Internacional de Quito. Julio, 2012 // WALSH. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito. Mayo 2011. Cap: 3, pp 26-27; Cap: 4, pp 22 -25, pp 90 // Granda P., Oswaldo. Plan Parcial De Ordenamiento Territorial De Las Parroquias Nororientales: Puenbo, Pifo, Tababela, Yaruqui, Checa, El Quinche Y Guayllabamba. May, 2006 // ADAMA assessment. Estudio De Urbanización Inducida De Las Parroquias Del Área De Influencia Directa Del Nuevo Aeropuerto Internacional De Quito. September, 2012.</p>	<p>*Assessment studies and reports addressing the effects of the constructed work on access and mobility or in the amount of traffic.</p> <p>* Detail studies taking into consideration reports, memoranda, minutes of meetings with managers and operators covering access to adjacent facilities amenities and transportation.</p> <p>* Consider use of rail, non-motorized transit, and pipeline access to ease congestion.</p>
<p>QL2.5 Encourage Alternative Modes of Transporta tion</p>	<p>0</p> <p>No Score</p> <p>The noise and security impacts of airports on communities suggest that the best location for them is outside of the main urban areas. Considering this, strengthening the connection between the airport and the city is fundamental.</p> <p>Even though the project team considered construction of additional means of access such as the Alpachaca connector, and coordination among different actors to provide public transportation (buses), the integration of additional infrastructure is urgently needed. To this end, alternative modes of transportation could be developed to reduce pollutant emissions from vehicles and to promote sustainable development that collaboratively reduces the existing congestion problems within the Quito Metropolitan District.</p> <p><u>Source:</u> Municipio Del Distrito Metropolitano De Quito. Plan De Desarrollo 2012 – 2022. December, 2011. Cap: 9, pp 30, 32, 84 // ADAMA assessment. Estudio De Urbanización Inducida De Las Parroquias Del Área De Influencia Directa Del Nuevo Aeropuerto Internacional De Quito. September, 2012.</p>	<p>*Location and design drawings showing proximity and pedestrian accessibility to the transportation facilities.</p> <p>* Location and design drawings showing bicycle and pedestrian walkways, trails and networks that connect to the site and constructed works, where these exist.</p>

<p>QL2.6 Improve Site Accessibility, Safety & Wayfinding</p>	<p>3</p>	<p>Enhanced</p> <p>The NQIA meets the signage requirements for safety and wayfinding within and around the site. A special study was implemented that considered passenger accessibility to the airport and movement within the terminal building. The infrastructure and signage is designed to handicap accessibility standards as well as emergency evacuation standards. Overall, the signage improves physical safety and security in relation to airport operations.</p> <p>Plans for accessibility to and protection of nearby sensitive sites and/or cultural sites are not included in the specific project, but possible future improvements could be considered that integrate the site with its surroundings, protect valuable sites, and benefit the residents of the area.</p> <p><u>Source:</u> Ziette Diseno. Manual de Análisis y Diagnóstico de Señalética del Nuevo Aeropuerto de Quito. June 2013</p>	<p>* Include plans for accessibility to and protection of nearby sensitive and/or cultural sites.</p> <p>* Elaborate plans showing how the project will integrate with the local community and its environmental and cultural resources.</p>
<p>QL3.1 Preserve Historic And Cultural Resources</p>	<p>7</p>	<p>Superior</p> <p>Prior to the start of construction, several on-site exploratory activities were performed regarding archaeological monitoring to ensure the protection and preservation of cultural and historical resources.</p> <p>During the construction phase, investments made by Quiport to aid the cultural and historical heritage of the neighboring communities focused on construction of the Alpachaca Connector Road. The road has historic importance as it links the parishes of Tababela with other settlements and has been maintained since Inca times. Preservation of the road was raised as an important issue during construction because one section of the road needed to be crossed by construction activities. Quiport invested over \$1 million toward the construction of a superspan (culvert) in order to maintain and preserve this symbol of Ecuador’s history.</p> <p>In addition, the project team maintained close contact with stakeholders and community leaders in order to respond to funding requests made by the local population for community sporting facilities and equipment. Enhancement or restoration of historic and cultural resources in the area could be part of the NQIA investment program in the future.</p> <p><u>Source:</u> Quiport. Social Investment Plan // Cardno Entrix. Actualización del Plan de Manejo Ambiental para el Nuevo Aeropuerto Internacional de Quito. Julio, 2012 // WALSH. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito. Mayo 2011.</p>	<p>* Identify resources that define the character of the community.</p> <p>* Additional effort on the feasibility of rehabilitation of historic and cultural resources in disrepair in the surrounding parishes</p>

<p>QL3.2 Preserve Views And Local Character</p>	<p>1</p>	<p>Improved</p> <p>The NQIA is located in a rural area and has a major visual impact. As such, several mitigation measures have been implemented to restore vegetation in affected areas. The reforestation plan using native species (Acacias) is especially relevant to the restoration of the landscape’s natural condition prior to the introduction of agricultural activity and foreign species into the area’s ecosystem. The project team has also identified environmentally-sensitive areas around the airport and proposed measures to protect and preserve them. Wildlife and water monitoring programs are conducted annually.</p>	<p>*Register any efforts to aid local communities in developing more comprehensive policies and regulations regarding views and fit with local character</p> <p>*Creation of plans drawings and reports, identifying important elements of the site character.</p>
		<p>These actions could be extended to nearby urban areas in order to preserve valuable elements of the urban character within local communities.</p>	
		<p><u>Source:</u> Geomanagement. Plan para la Protección de las Áreas Ambientalmente Sensibles del Nuevo Aeropuerto Internacional de Quito (NAIQ). October 2008 // Cardno Entrix. Actualización del Plan de Manejo Ambiental para el Nuevo Aeropuerto Internacional de Quito. Julio, 2012 // WALSH. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito. Mayo 2011.</p>	
<p>QL3.3 Enhance Public Space</p>	<p>1</p>	<p>Improved</p> <p>The construction of the NQIA did not have any adverse effects on existing public spaces as it was built on agricultural land outside of the city. However, it has a significant impact on the livability of surrounding communities, which have experienced constant development over time, the introduction of new industries related to the airport, increased traffic, and changes to property values.</p>	<p>* Consider creation of new public space in the project or enhancement of existing public space in the surrounding areas</p>
		<p>To mitigate these impacts, the NQIA invested in the preservation of the surrounding natural area formed by a system of ravines, watercourses, wildlife, and native forest. The project also includes a Social Investment Plan, but it does not include improvement of public spaces within impacted communities. Considering the importance of impacts on public spaces to the quality of life of communities, mitigation measures could be implemented in the future to promote the creation of new public spaces or the enhancement of existing ones.</p>	
		<p><u>Source:</u> Granda P., Oswaldo. Plan Parcial De Ordenamiento Territorial De Las Parroquias Nororientales: Puembo, Pifo, Tababela, Yaruqui, Checa, El Quinche Y Guayllabamba. May, 2006 // Municipio Del Distrito Metropolitano De Quito. Plan De Desarrollo 2012 – 2022. December 2011 // Quiport. Social Investment Plan.</p>	
<p>QL0.0 Innovate Or Exceed Credit Requirements</p>	<p>0</p>	<p>N/A</p>	
<p>68</p>			

SUB CATEGORY:LEADERSHIP		
	NEW QUITO INTERNATIONAL AIRPORT, ECUADOR	RECOMMENDATIONS
LD1.1 Provide Effective Leadership And Commitment	<p>Superior</p> <p>The commitment of the NQIA to address the economic, environmental, and social aspects of the project at each stage is evidenced by the specific programs presented in the Environmental Management Plan (EMP) and the Social Management Plan (SMP). Both documents are a blueprint for the project’s principles of sustainability, and include concrete activities and continuous monitoring to achieve their proposed goals.</p> <p>The EMP comprises several plans, which are developed and monitored under separate cover, to mitigate and reduce the project’s negative environmental impacts. These plans assign specific responsibilities and address aspects such as land use, security and prevention, waste management, water management, training and education, community relations, areas of conservation, areas of rehabilitation, and monitoring.</p> <p>The SMP focuses on the social impact of the project to serve the community. The Plan includes the definition of roles and responsibilities, identification of stakeholders, a public consultation and disclosure plan, and investments.</p> <p>All subcontractors and suppliers of the airport must comply with Quitport’s Sustainability Policy as well as all environmental requirements stipulated in the contracts. Among the programs presented, it should be noted that the project also includes a plan to lead the closure and abandonment of the old airport, and to achieve integration of the area with Quito.</p> <p><i>Source: Cardno Entrix. Actualización del Plan de Manejo Ambiental para el Nuevo Aeropuerto Internacional de Quito. Julio, 2012 // Quiport. The Social Management Plan For The New Quito International Airport. September, 2006 // Corporación Aeropuerto y Zona Franca Del Distrito Metropolitano De Quito, CORPAQ. Plan de Cierre: Estudio Para La Remediación De Pasivos Ambientales Y Plan De Cierre Del Aeropuerto Mariscal Sucre De Quito, Aims. Mayo 2009 // Política de Sostenibilidad de Corporacion Quiport S.A // Proyecto: Estrategia para la Reducción de Emisiones de Óxidos de Nitrógeno (NOx) para el Nuevo Aeropuerto Internacional de Quito (NAIQ).Enero 2009.</i></p>	<p>* Expand the understanding of the issues and problems associated with sustainability.</p> <p>* Explicit recognition of the need for action to address the consequences of operating in a non-sustainable environment.</p>
	9	
LD1.2 Establish A Sustainability Management System	<p>Superior</p> <p>Quitport is responsible for the overall development, implementation, management and monitoring of the Environmental Management Plan (EMP) during the construction and operation phases of the project. In addition, Quitport is responsible for ensuring that the contractor and subcontractors for all phases comply with environmental laws and standard industrial practices.</p>	<p>* Strengthen management policies specifically in full alignment with project scope, scale and complexity.</p> <p>* Prioritize environmental, economic and societal</p>
	7	

		<p>The company has an Environmental Management System (EMS) that operates under the guidelines of an Integrated Management System under the ISO 9001:2008 (Quality), ISO 14001:2008 (Environment) and OHSAS 18001:2004 (Safety, Health) standards. These standards control all procedures associated with the development of and activities performed at the airport, thus clear procedures are in place. Environmental management systems are designed to provide a system of continuous environmental improvement to satisfy the legal and contractual obligations of the project.</p> <p><i>Source: Cardno Entrix. Actualización del Plan de Manejo Ambiental para el Nuevo Aeropuerto Internacional de Quito. Julio, 2012. Cap: 2, pp: 3 // Política de Sostenibilidad de Corporacion Quiport S.A.</i></p>	<p>aspects of the project based on importance in meeting both project and sustainability goals.</p>
<p>LD1.3 Foster Collaborati on And Teamwork</p>	<p>8</p>	<p>Superior</p> <p>The project team approaches the project systematically. Different phases of the project are managed through collaborations between a broad set of stakeholders and a multidisciplinary team with the objective of optimizing the overall performance of the NQIA.</p> <p>The complexity of the project necessitates collaboration among the three main actors: Quitport (management), AECON (contractor), and Quito Municipality (local government). Many other disciplines and external agencies are also included in the project development, especially with regard to the protection of flora and fauna and the water management system.</p> <p>With regard to project operation, Quitport implemented an Infractions System for Commercial Operators that responds to the needs of the project to socialize, educate, monitor, and supervise corrective actions in resources management with emphasis on the following aspects: environment, health, security, and social responsibility. Quitport conducts periodic visits and technical inspections to verify that the operators follow best practices. Different fines and penalties are assessed depending on the violation committed.</p> <p><i>Source: Quiport. Sistema de Infracciones y Amonestaciones para Operadores Comerciales del Nuevo Aeropuerto Internacional de Quito. Septiembre 2012 // Cardno Entrix. Actualización del Plan de Manejo Ambiental para el Nuevo Aeropuerto Internacional de Quito. Julio, 2012 // Quiport. The Social Management Plan For The New Quito International Airport. September, 2006.</i></p>	<p>* Strengthen risk/reward sharing as part of the owner’s contract with other stakeholders</p> <p>* The multi-disciplinary project team should work together to find ways to improve sustainable performance, commensurate with the owner’s goals and objectives, technical feasibility, costs, and appetite for risk.</p>
		<p>Enhanced</p>	
		<p>5</p>	
<p>LD1.4</p>	<p>5</p>	<p>Enhanced</p>	<p>*Register opinions and</p>

<p>Provide For Stakeholder Involvement</p>	<p>Since the design phase of the NQIA, the Public Consultation and Disclosure Plan (PCDP), which is a component of the Social Management Plan, has ensured that adequate information has been provided to project-affected people and other stakeholders in a timely manner. Moreover, these groups have been able to raise their concerns in time for measures to be incorporated into the project design.</p> <p>One of the main goals of the PCDP, in conjunction with the municipality, CORPAQ and other applicable governmental authorities, is to increase awareness of environmental, health and safety issues throughout nearby parishes by means of a continuous educational program. During construction, the PCDP has been implemented and monitored by Quitport, with participation by Engineering, Procurement and Construction (EPC), Aecon-Andrade Gutierrez Construction Company (AAGC), and the municipality (CORPAQ). In terms of communication during the operational phase, the PCDP allows constant and permanent linkages and channels of communication between stakeholders and the NQIA management team.</p> <p><i>Source: Quiport. The Social Management Plan For The New Quito International Airport. September, 2006 // Cardno Entrix. Actualización del Plan de Manejo Ambiental para el Nuevo Aeropuerto Internacional de Quito. Julio, 2012</i></p>	<p>concerns of all stakeholders, and its impact on project decisions.</p> <p>*Policies and business practices that ensure fair and equitable assessment and action. Letters, memoranda, notes and minutes that control its application.</p>
<p>LD2.1 Pursue By-Product Synergy Opportunities</p>	<p>No Score</p> <p>In regard to by-product synergy, no specific program for identifying and using unwanted materials from nearby facilities has been developed. To reduce project costs and the use of raw materials, soil extracted during excavation was used in filling and leveling work.</p> <p>The NQIA is already operational, but it will likely be expanded in the future. Thus, identification and characterization of nearby facilities could contribute to the pursuit of future potential by-product synergy opportunities.</p> <p><i>Source:</i> Not provided</p>	<p>* Map and register opportunities in nearby facilities.</p> <p>* Develop proposals to make use of the opportunities of by-product synergy in the future expansions.</p>
<p>LD2.2 Improve Infrastructure Integration</p>	<p>Superior</p> <p>Even though responsibility for the transportation network rests with the Metropolitan District of Quito and the central government, the NQIA project considered regional strategic plans and municipal road improvement projects in its location and design. The project team improved the existing road infrastructure in order to achieve a better connection between the airport and Quito.</p> <p>According to the Metropolitan Road Plan, in the future two roads will connect the airport with the existing road network. Today, the only access is over the South road, known as Ruta Zambiza. Quitport provided additional investments for the Alpachaca connector road, which was required to link the airport to the existing transportation network. The North road connection, known as Ruta Collas, is currently under construction.</p> <p>In terms of water infrastructure, the design of the project considered existing water bodies in the surrounding area, and included an</p>	<p>* Compile documentary evidence on how the project takes into account not only the physical infrastructure elements but also related community assets</p> <p>* Give documentary evidence on how existing infrastructure has been restored.</p>

		<p>integrated water management system to prevent water contamination and flooding.</p> <p><i>Source: Municipio del Distrito Metropolitano de Quito. Plan de Desarrollo 2012 – 2022. Diciembre 2011 // ADAMA Assessment. Estudio De Urbanización Inducida De Las Parroquias Del Área De Influencia Directa Del Nuevo Aeropuerto Internacional De Quito. Septiembre 2012 // Granda P., Oswaldo. Plan Parcial De Ordenamiento Territorial De Las Parroquias Nororientales: Puembo, Pifo, Tababela, Yaruqui, Checa, El Quinche y Guayllabamba. Mayo 2006 // De La Torre, Francisco. Actualización del estudio de Impacto Ambiental del Nuevo Aeropuerto de Quito. Abril 2002 // Cardno Entrix. Actualización del Plan de Manejo Ambiental para el Nuevo Aeropuerto Internacional de Quito. Julio, 2012</i></p>	
LD3.1 Plan For Long-Term Monitoring & Maintenance	10	<p>Superior</p> <p>Plans regarding ecological protection, mitigation and enhanced measures were incorporated at the early stages of the NQIA project. The documentation provided includes long-term strategies and monitoring measures based on the actions and objectives defined by each plan.</p> <p>The following environmental components are being monitored during the construction and operational phases of the project: emissions, dust generation, noise, water, groundwater, soil quality, waste, biologic, archaeological, and social. These activities are handled by AAGC, CORPAQ, or Quiport, as appropriate.</p> <p>To guarantee plan implementation, funds and responsibilities have been assigned and specific people and organizations have been designated to monitor and maintain the different programs included in the project. Information regarding funding allocation has also been provided.</p> <p><i>Source: Cardno Entrix. Actualización del Plan de Manejo Ambiental para el Nuevo Aeropuerto Internacional de Quito. Julio, 2012. Cap: 3, pp: 1-10, Cap:4, pp:1-2, Cap: 8, pp 76 // WALSH. Adendum al Estudio de Impacto y Plan de Manejo Ambiental. Mayo 2011. Cap:9, pp 1-13, Cap: 11, pp: 1-21</i></p>	<p>* Ensure that the performance of the programs will be maintained throughout the design life of the project.</p>
LD3.2 Address Conflicting Regulations & Policies	4	<p>Superior</p> <p>Three different issues regarding conflicting regulations have been identified that could create barriers to the implementation of sustainable practices in the airport. The first conflict relates to the old airport closure plan and the requirement for changes in land use to redevelop the site as a park. Quiport participated in the closure plan led by the Metropolitan Government to recover the area, and helped conduct a land use study to renovate the old airport site as an urban park for Quito. The second conflict also regards the need for revised ordinances and land use changes, but in relation to the siting of the new airport in a rural, undeveloped area. Quiport commissioned a Land Use Proposal regarding noise impacts, which was given to the municipality for the update of the land use ordinance. The third conflict is related to nitrogen oxide (NOx) emissions. The Air Quality Assessment for the NQIA anticipated future scenarios in which the level of NOx may exceed limits established by Air Quality Ecuadorian Environmental Laws and the requirements of the Common Terms Agreement (CTA) with the lenders. As a result, a Strategy for</p>	<p>* Increase efforts and perseverance in working with regulators to resolve conflicts.</p> <p>* Documentation showing how the overall design and construction standards and practices need to be changed to address new problems arising from sustainability issues.</p>

		<p>Reducing Emissions of NOx for the NQIA was developed to provide realistic mitigation measures to reduce NOx emissions with complementary restrictions for airplanes.</p> <p><i>Source: Geomanagement. Update Of The Land Use Proposal For The 65-Decibel Zone Of The New Quito International Airport. January, 2009 // Corporación Aeropuerto y Zona Franca Del Distrito Metropolitano De Quito, CORPAQ. Plan de Cierre: Estudio Para La Remediación De Pasivos Ambientales Y Plan De Cierre Del Aeropuerto Mariscal Sucre De Quito, Aims. Mayo 2009 // Proyecto: Estrategia para la Reducción de Emisiones de Óxidos de Nitrógeno (NOx) para el Nuevo Aeropuerto Internacional de Quito (NAIQ). Enero 2009.</i></p>	
LD3.3 Extend Useful Life	3	<p>Enhanced</p> <p>The project implemented an integrated water management system to avoid flooding and preserve the water quality of the surrounding area. Considering that extreme weather events due to climate change will likely impact the area, this infrastructure will help the airport achieve a better level of resiliency and avoid operational interruptions.</p> <p>In addition, the terminal building is built according to national and international construction standards defined for airports, and incorporates seismic-resistant measures that enhance the durability and resilience of its design. This minimizes potential damages from a seismic event.</p> <p>A future expansion is mentioned as part of the project, but the documentation provided is not clear on whether and how the new construction will be similarly adapted. Flexibility should drive the airport's design as additional future expansions may be needed.</p> <p><i>Source: Not provided</i></p>	<p>* Evaluate how the overall project design will allow for expansion reconfiguration, or multiple uses</p> <p>* Provide documentation showing the specification of durable materials and how these improve upon industry norms.</p>
LD0.0 Innovate Or Exceed Credit Requirements	0	N/A	
53			

CATEGORY II: CLIMATE AND ENVIRONMENT (CE)			
RESOURCE ALLOCATION			
	NEW QUITO INTERNATIONAL AIRPORT, ECUADOR		RECOMMENDATIONS
RA1.1 Reduce Net Embodied Energy	0	<p>No Score</p> <p>The Environmental Management Plan of the NQIA is the blueprint for the activities related to the phases of construction, operation and abandonment of the project and sets the environmental standards to achieve. However, there is no data available to prove that a Life Cycle Energy Assessment (LCA) in accordance with recognized and accepted methodologies was done to determinate the net embodied</p>	<p>*An estimation of the Life-cycle energy assessment should be done.</p> <p>*Give information about embodied energy of the significant materials.</p>

		energy of the project.	*Implement strategies to reduce the embodied energy.
		<u>Source:</u> Not provided	
RA1.2 Support Sustainable Procurement Practices	0	No Score	*Register the total weight of volume of materials.
		Any subcontractor who signs a contract with Quiport Corporation must accept the environmental standards established in the Environmental Management Plan. However, there is no specific data about suppliers' performance regarding sustainable procurements; therefore, it is unknown if materials have been purchased from suppliers that follow sustainable practices.	*A sustainable procurement program considering of polices and criteria for supplier identification and selection.
		<u>Source:</u> Not provided	*Certification of materials and suppliers
RA1.3 Used Recycled Materials	0	No Score	* Provide an inventory of materials and quantify the percentage (by weight or volume) that are reused or recycled.
		The information provided neither refers to use of any recycled materials during project construction, nor provides an inventory of existing materials or structures that may have reuse potential or a list of specific materials with recycled content. Therefore, it is unknown whether a reduction in the use of virgin materials was achieved.	* Documentation about quality and performance criteria required for the intended application.
		<u>Source:</u> Cardno ENTRIX. Actualización del Plan de Manejo Ambiental Nuevo para Nuevo Aeropuerto de Quito. July, 2012, Cap 2, pp 23-33	
RA1.4 Use Regional Materials	0	No Score	* Evaluate the percentage of total project materials - by cost- that are sourced locally.
		Given the specific technical needs and total cost of the project, the level of acquisition of local materials is relatively low. The Monitoring Report of January 2012 indicates that 4.18% of the materials were locally sourced, which did not significantly minimize transportation costs and impacts during the phases of construction of the NQIA.	
		<u>Source:</u> Nuevo aeropuerto internacional de quito. Informe mensual de monitoreo físico, biótico, de salud humana y social - Enero 2012. Cap: 3.2.1 y Anexo: 3.2.1	
RA1.5 Divert Waste From Landfills	6	Enhanced	*Monitor the efficiency or the strategies included in the project to reduce waste generation and to maximize waste reduce and recycling.
		The NQIA generates a wide variety of solid residues, among which are rubber, plastic, organic material, wood and junk. The project has developed a Comprehensive Waste Management Plan that indicates use of a waste classification system for the collection, disposition and management of all the solid residues produced by airport operations. In addition, the airport management office has established procedures and guidelines for the management of waste, and each operator or entity associated with the NQIA is responsible for separating recyclable solid waste so it can be properly delivered to Environmental Managers authorized by the Environmental Control Authority. The policies defined by the NQIA for solid waste recycling include separate containers for recyclables (plastic, cardboard, paper), non-recyclables (all other non-hazardous wastes), hazardous materials (oil, other contaminated materials, etc.) and biological waste.	* Inventory of project waste streams and potential sites for acceptable reuse or recycling. *Develop specific strategies for hazardous waste reduction.

	<p>Of the total percentage of waste produced by airport operations, around 30% is recyclable 58% organic waste that is partially reused. It is estimated that 50% of the total amount of waste is recycled or reused and 50% is disposed in authorized landfills.</p> <p><u>Source:</u> WALSH. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito. Mayo 2011. Cap: 8, pp 22-29, Cap: 10, pp 26 – 30 // Quiport SA. Plan de Manejo de Residuos Nuevo Aeropuerto Internacional Mariscal Sucre de Quito. Junio 2013 // EHS. Plan de manejo de desechos para el Nuevo Aeropuerto de Quito. Marzo 2012</p>	
<p>RA1.6 Reduce Excavated Materials Taken Off Site</p>	<p>6</p> <p>Conserving</p> <p>The project was constructed with minimal earth removal from the site. The techniques used for cut and fill operations reduced the amount of excavated material taken off site. One goal of the project was to avoid any net import or export of earth by reusing the excavated material for filling or leveling.</p> <p>Due to the large volume of land that was moved (approximately 7 million cubic meters) during the construction phase, a huge amount of vegetation and organic material was generated from the cleared area, which was disposed of on the northern side of the plateau, in a specifically designated location. It is important to note that the area designated for plant material collection does not interfere with any future development area.</p> <p>Today, the airport is in operation, and land movement is complete. Maintenance of a small production area on-site yields a small amount of plant material that is deposited in the aforementioned designated location. Natural regeneration has occurred and the area is now covered by vegetation, which mitigates the amount of dust suspended in the air that spreads to the surrounding landscape.</p> <p><u>Source:</u> WALSH. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito. Mayo 2011. Cap: 4, pp: 14 - 16</p>	
<p>RA1.7 Provide for Deconstruc tion & Recycling</p>	<p>0</p> <p>No Score</p> <p>Planning for the future deconstruction of the project, and considering the disassembly and possible reuse of infrastructure at the end of its useful life is a practice that should be encouraged. The life expectancy of infrastructure typically is longer than the concession period. Even though the concession for Quitport S.A. is for a period of 35 years, the project could design a strategy for disassembly or consider what percentage of components could be easily separated and reused. However, no documentation has been provided.</p> <p><u>Source:</u> Not provided</p>	<p>* Provide data about efforts to use recycled materials.</p> <p>* There are not documents available showing materials easily disassembled.</p>

RA2.1 Reduce Energy Consumption	0	No Score	* Identify and analyze options for reducing energy consumption in the operation and maintenance of constructed works
		No measures to reduce energy consumption during the operation and maintenance phases have been implemented at the NQIA, and therefore no data or materials for analysis are available.	
		<u>Source:</u> Not provided	
RA2.2 Use Renewable Energy	0	No Score	* Provide documentation of the annual percentage of renewable energy used to meet energy needs
		Even though the NQIA has not implemented any strategies to incorporate renewable energy sources into the operations of the project, the managers are considering implementation of a photovoltaic system in the medium term.	
		<u>Source:</u> Not provided	
RA 2.3 Commission & Monitor Energy Systems	3	Enhanced	* Analyze how the monitoring process can contribute to a level of operation that exceeds industry standards. *Independent authority that monitored energy systems.
		The project includes internal monitoring of the energy systems and continuous training programs for maintenance personnel to ensure efficient functioning of all operating systems. However, no independent commissioning has been contracted to evaluate the performance of the energy systems of the project. Though the internal monitoring can be viewed as an initial effort to achieve efficiently functioning energy systems, still greater efforts are needed to incorporate long-term monitoring into the project to ensure energy system performance.	
		<u>Source:</u> Cardno ENTRIX. Actualización del Plan de Manejo Ambiental Nuevo para Nuevo Aeropuerto de Quito. July, 2012 // WALSH. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito. Mayo 2011	
RA3.1 Protect Fresh Water Availability	17	Conserving	* Develop strategies to achieve increasingly less negative impact on groundwater and surface water quality and quantity.
		The project includes a stormwater management system that provides for separation of sediments, accumulation of water in ponds, and rainwater harvesting and reuse of water in airport gardens. These mechanisms reduce impacts to aquifers, groundwater and freshwater sources. A system to manage wastewater treatment is also part of the NQIA.	
		Currently, the NQIA is implementing a biannual program to monitor water quality, which allows for a detailed identification of potential impacts. Thanks to this level of control it is possible to detect sources of water pollution and put appropriate measures in place quickly. Tests have also been conducted on groundwater, surface water, wastewater and rainwater.	
		Prevention of water contamination is also factored into the project through identification of potential sources of contamination, concrete measures, prevention strategies and a list of best practices to achieve a better integral control of water resources. With these integrated water management systems operating, the project will not have a net impact on water supply volumes.	
		<u>Source:</u> NQIA. Programa de monitoreo hidrológico e hidrogeológico en la meseta de Caraburo, 2010-2011 // WALSH. Décimo Informe de Monitoreo Bianual de Biodiversidad y Calidad de Agua de las Quebradas que rodean el el NAIQ: Fase de Construcción, Epoca Lluviosa - Diciembre 2011. February, 2012. Cap 4 // NQIA. Plan de manejo integrado de aguas lluvias, residuales sanitarias e industriales	

		Nuevo Aeropuerto Internacional de Quito, Version 4. Abril 2011	
RA3.2 Reduce Potable Water Consumption	0	No Score	<p>*Calculations estimating annual water consumption over the life of the project.</p> <p>* Include an inventory of measures taken to reduce potable water consumption during operations</p>
		<p>The water cycle within the airport involves the following steps, which are not in a particular order: water supply, treatment, storage, distribution, use and disposal. Recommendations for environmental management best practices are included in the Water Contamination Prevention Plan of the NQIA. The best practices entail reduction in water consumption, recycling and reutilization of water, reduction of toxicity and contaminants, recovery and recycling of chemical products. However, the strategy for recycling and reutilizing water faces economic and technical challenges for implementation. The characteristics of wastewater from the multiple commercial operators at the airport limit the potential for reuse and recycling of water.</p> <p>Even though the project includes general considerations and strategies to optimize the use of freshwater resources, the documentation provided does not contain specific data about water consumption and reduction of non-replenishable potable water use.</p> <p><u>Source:</u> ADC & HAS, Quiport. Plan para la prevención de la contaminación del agua. Marzo, 2010 // NQIA. Plan de manejo integrado de aguas lluvias, residuales sanitarias e industriales Nuevo Aeropuerto Internacional de Quito, Versión 4. Abril 2011</p>	
RA3.3 Monitor Water Systems	6	Superior	<p>* Integrate monitoring activities into operations to enable the operator to make adjustments in the operations to reduce negative impacts and improve efficiency.</p>
		<p>The water-monitoring program included in the project’s Integrated Plan for Water Management incorporates measures into the design and operation phases to enable long-term water quality monitoring and reporting of surface and groundwater quantity and quality. The monitoring program is design to verify that pollution control measures are working properly. In addition, the wastewater treatment plant included in the project returns water to pre-use conditions according to the environmental parameters established by law. Therefore, there are no uncontrolled discharges to the water bodies. In relation to the operational efficiency of the project, the documentation contemplates continuous monitoring of the water systems to ensure the correct functioning of the treatment plants and to prevent possible leaks.</p> <p><u>Source:</u> NQIA. Plan de manejo integrado de aguas lluvias, residuales sanitarias e industriales Nuevo Aeropuerto Internacional de Quito, Versión 4. Abril 2011// WALSH. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito. Mayo 2011. Cap: 9, pp: 6 -9. Cap: 11, pp: 11-14 // ADC & HAS, Quiport. Plan para la prevención de la contaminación del agua. Marzo, 2010.</p>	
RA0.0 Innovate Or Exceed Credit Requirements	0	N/A	
	38		

NATURAL WORLD		
	NEW QUITO INTERNATIONAL AIRPORT, ECUADOR	RECOMMENDATIONS
<p>NW1.1 Preserve Prime Habitat</p>	<p>14</p>	<p>* Include the restoration of prime habitat adjacent to project's site, as determined by a qualified ecosystem professional.</p>
	<p>Conserving</p> <p>Due to its geographical location, the area of the New Quito International Airport (NQIA) is one of the few dry areas with minor importance both for conservation and for the preservation of wildlife species and flora. However, the area surrounding the project is comprised of a valuable natural fragile ecosystem of ravines and forests. Therefore, the project includes a plan to legally designate this area as "Protected Forest". This plan was presented to the Metropolitan Direction of Environment in June 2007; however, the proposal is still subject to approval by the Environmental Secretariat.</p> <p>The proposed "Protected Forest" area includes conservation areas located on the plateau and additional areas where construction will not occur such as the gorges of the rivers Guambi, Guayllabamba, Uravia, and the northern part of the Santa Rosa gorge. These areas comprise 603.98 ha.</p> <p>Moreover, the project includes a 155.5 ha buffer from the edge of streams within 100m (328 ft.) inwards towards the plateau. The buffer is a transition area developed to prevent impacts generated by the project activities on protected areas, which also coincide with the geotectonic risk areas.</p> <p>Restoration will take place in the northern area of the platform, and will include removal of non-native plant species and reforestation with native and endemic species to recover the original ecosystem lost due to anthropogenic activities.</p> <p><u>Source:</u> Geo Management. Plan para la Protección de las Áreas Ambientalmente Sensibles del NAIQ. October, 2008 // WALSH. Décimo Informe de Monitoreo Bianual de Biodiversidad y Calidad de Agua de las Quebradas que rodean el el NAIQ: Fase de Construcción, Epoca lluviosa - Diciembre 2011. February, 2012 // WALSH. Estudio de Línea Base de las Quebradas que Rodean al Área de Construcción del Nuevo Aeropuerto Internacional de Quito, previo al Monitoreo Biótico Bi-anual de la Fase de Construcción. July, 2007 // Cardno ENTRIX. Actualización del Plan de Manejo Ambiental Nuevo para Nuevo Aeropuerto de Quito. July, 2012.</p>	

<p>NW1.2 Preserve Wetlands and Surface Water</p>	<p>14</p>	<p>Conserving</p> <p>The NQIA occupies an area of about 1,500 ha on a plateau surrounded by deep ravines. The western, northern and eastern limits of the site are defined by steep cliffs that descend into the Guambi, Urvia, and Santa Rosa river gorges respectively. To help preserve these surface water bodies, there is a 100-meter (328-foot) buffer between the edge of the rivers and the project boundary.</p> <p>In addition, prior to construction of the project, Quitport S.A. hired Walsh Environmental Scientists and Engineers, Inc. (WALSH - Ecuador) to perform a study of the biotic and water quality baselines in streams and ravines located on the perimeter of the NQIA site. The study reviewed both the physical components (including hydrology and water quality), and the biotic components (flora and fauna) of the streams; helped in the creation of new models for interpreting biotic and water quality; and made actionable recommendations to minimize and mitigate impacts identified during construction and operation of the site.</p> <p>The study also established a long-term, bi-annual, quantitative sampling schedule for biotic monitoring against the baseline data. The most recently available monitoring information from February 2012 indicated that there is no evidence that the airport construction and operational activities are impacting water quality or flows and that the water bodies are well preserved.</p> <p><u>Source:</u> Geo Management. Plan para la Protección de las Áreas Ambientalmente Sensibles del NAIQ. October 2008 // Cardno ENTRIX. Actualización del Plan de Manejo Ambiental Nuevo para Nuevo Aeropuerto de Quito. July, 2012 // WALSH. Décimo Informe de Monitoreo Bianual de Biodiversidad y Calidad de Agua de las Quebradas que rodean el el NAIQ: Fase de Construcción, Epoca Lluviosa - Diciembre 2011. February, 2012 // Programa de monitoreo hidrológico e hidrogeológico en la meseta de Caraburo, 2010-2011 // WALSH. Estudio de Línea Base de las Quebradas que Rodean al Área de Construcción del Nuevo Aeropuerto Internacional de Quito, previo al Monitoreo Biótico Bi-anual de la Fase de Construcción. July, 2007.</p>	<p>* Include a restoration plan outlining any efforts to restore wetlands or water bodies</p> <p>* Monitor the evolution of the buffer areas, in order to guarantee the protection of water bodies.</p>
<p>NW1.3 Preserve Prime Farmland</p>	<p>0</p>	<p>No Score</p> <p>The Update to the Environmental Impact Study for the New Quito International Airport shows that the predominant soil types are J (~42%) and JH (~24%), and thus the soil composition of the plateau on which the airport is located is well suited to agriculture. The slopes and streambeds are characterized by miscellaneous soil types, and should be allocated for vegetation management and protective cover than farming. Thus, while the slopes should remain grassy, the conditions of the plateau are better suited for agricultural use than development of a new airport. Furthermore, in January 2001, the General Plan of Territorial Development of the Quito Metropolitan Region District (PGDT), had slated the area of the airport for agricultural or residential use.</p> <p>In May 2006, before construction of the project began, the Partial Plan for Territorial Use of the northern districts of the Metropolitan District of Quito asserted that the mere expectation of the NQIA would cause land speculation and urbanization in that area. In addition, approximately 5,000 workers will commute daily to the</p>	<p>* Identify and protect soils designated as prime farmland, unique farmland or farmland of statewide importance</p>

		<p>airport, which will increase the pressure for a local shift in land use from agricultural to urban.</p> <p><u>Source:</u> De la Torre, Francisco. Actualización del estudio de Impacto Ambiental del Nuevo Aeropuerto de Quito, Informe Final. Abril 2002 // Granda Páez, Oswaldo. Plan parcial de ordenamiento territorial de las parroquias nororientales: puembo, pifo, tababela, yaruqui, checa, el quinche y guayllabamba. Mayo 2006 // Cardno ENTRIX. Actualización del Plan de Manejo Ambiental Nuevo para Nuevo Aeropuerto de Quito. July, 2012.</p>	
NW1.4 Avoid Adverse Geology	3	<p>Superior</p> <p>Continental Ecuador is located in the edge zone of the continental plate, where the phenomenon known as subduction occurs. This phenomenon is responsible for the tectonic, seismic, volcanic, and geodynamic activity of the region, which is divided into three physiographic zones: Coastal area, Andes Mountains, and Amazon Basin.</p> <p>The project is located on a plateau formed by volcanic sediments that has steep slopes prone to gradual processes of erosion and low-intensity landsliding due to the surrounding riverbeds. In terms of seismic activity, faultlines have been well-identified and the studies presented indicate that the region could be affected by earthquakes with an estimated magnitude of 7.0 on the Richter scale. In terms of volcanic activity, the area where the airport is located is outside the risk area of direct lava flows, but depending on wind conditions, could be subject to the risk of airborne volcanic ash. The project considered all the different geological risks present in the area, with plans and designs developed to reduce the risk of damage due to external forces.</p> <p><u>Source:</u> Cardno ENTRIX. Actualización del Plan de Manejo Ambiental Nuevo para Nuevo Aeropuerto de Quito. July, 2012 // SyR, Servidios y Remediación S.A. Programa de monitoreo hidrológico e hidrogeológico en la meseta de Caraburo 2010-2011 // De la Torre, Francisco. Actualización del estudio de Impacto Ambiental del Nuevo Aeropuerto de Quito, Informe Final. Abril 2002</p>	* Documentation showing that no faults and karst features exist on site, nor do any site activities affect underlying aquifers.
NW1.5 Preserve Floodplain Functions	8	<p>Superior</p> <p>Due to the low precipitation rate and high soil absorption rate of the land where the NQIA is located, it is not expected that any future floods will cause damage to the airport infrastructure. According to the Post-Development Conditions Land Uses Map, which quantifies the surface types and areas, 560 ha comprise pervious surfaces and 157 ha comprise impervious surfaces. Therefore, most of the surface area is pervious and will preserve the site's irrigation capabilities.</p> <p>The project also benefits from a System of Rainwater Harvesting designed to handle regular storms and flood events, and to capture and reuse stormwater runoff. The system consists of open ditches, culverts and storm drains, a separate pool for stormwater management, and a drainpipe to the Guayllabamba River. Stormwater management infrastructure has been designed to capture and repurpose more than 100% of on-site stormwater.</p> <p>The airport project includes land use strategies to maintain and enhance the surrounding habitat; these include provision of a buffer</p>	* Provide documentation with strategies used to maintain or enhance aquatic habitat connectivity, fish and sediment transport, including removal of barriers and traps.

		<p>area and permanent monitoring programs of water body and wildlife quality. In addition, according to the Environmental Management Plan, a native species reforestation program is proposed on the north end of the project that will contribute to the overall capacity for stormwater absorption.</p> <p>In case of emergency, the project includes a comprehensive flood emergency management plan to address the operation and/or evacuation plans for all infrastructure in the floodplain.</p> <p><u>Source:</u> Cardno ENTRIX. “Cap.3 Programa de Monitoreo Ambiental – Fase Construcción.” Actualización del Plan de Manejo Ambiental Nuevo para Nuevo Aeropuerto de Quito. 2.11. Plan de Rehabilitación de Áreas Afectadas. July, 2012 // Plan de manejo integrado de aguas lluvias, residuales sanitarias e industriales Nuevo Aeropuerto Internacional de Quito, Version 4. Abril 2011// AECON AG. “7.4.3.8. Inundaciones. Constructores S.A.” Plan de Acción de Emergencias y Contingencias del NQIA (PAE), 50 // WALSH. “Cap.4. Resultados y Discusión”. Décimo Informe de Monitoreo BIANUAL de Biodiversidad y Calidad de Agua de las Quebradas que rodean el el NAIQ: Fase de Construcción, Época Lluviosa - Diciembre 2011. February, 2012 // WALSH. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito. Mayo 2011</p>	
NW1.6 Avoid Unsuitable Development on Steep Slopes	6	<p>Conserving</p> <p>As the airport necessitates flat topography for runways, no hillsides or steeply-sloped areas were selected in the siting of the project or contend with the design and operation of the airport. Rather, the project is located on a plateau that presents an average north-south slope of 1.25% and an average east-west slope of slightly more than 2%.</p> <p>In the case of minor slopes and ground leveling during the construction phase, mitigating infrastructure such as retaining walls and soil compaction were considered in order to avoid future landslides and soil erosion.</p> <p><u>Source:</u> WALSH. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito. Mayo 2011</p>	*Documentation to identify specific areas with landslides risk.
NW1.7 Preserve Greenfields	0	<p>No Score</p> <p>The selection of an undeveloped greenfield site for the airport arose out of urgency for an expanded airport that would accommodate demand, and the need to relocate the existing airport outside of the urban core to minimize noise and safety impacts to residents. Another important factor in site selection was the limited existence of flat land available in Quito’s metropolitan area that also had the necessary connections to the existing transportation networks within Quito.</p> <p>Considering all these conditions, the Caraburo Plateau, on which the project was constructed, presented the ideal conditions: large expanse of undeveloped flat land with proximity to Quito. Therefore, the project was located on a greenfield site, with minimal consideration for the redevelopment of a brownfield.</p>	* Develop compensation strategies related with the occupation of previous greenfields

		<p><u>Source:</u> WALSH. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito. Mayo 2011 // De la Torre, Francisco. Actualización del estudio de Impacto Ambiental del Nuevo Aeropuerto de Quito, Informe Final. Abril 2002 // Granda Páez, Oswaldo. Plan parcial de ordenamiento territorial de las parroquias nororientales: puebo, pifo, tababela, yaruqui, checa, el quinche y guayllabamba. Mayo 2006 // Cardno ENTRIX. Actualización del Plan de Manejo Ambiental Nuevo para Nuevo Aeropuerto de Quito. July, 2012.</p>	
<p>NW2.1 Manage Stormwater</p>	<p>21</p>	<p>Restorative</p> <p>Studies by WALSH and Quito’s Air Corporation Improvement Program (CORPAIRE) indicate that rainfall in the Caraburo Plateau and surrounding streams is low - typically less than 500 mm per year. The rainy seasons typically occur between March and April and between October and December with a pronounced dry season from June to August, although there may be significant annual variation in dry and rainy seasons due to the events of El Niño and La Niña.</p> <p>In consideration of these conditions, the project includes an Integrated Management Plan for stormwater and wastewater. The plan is the blueprint that determines the physical characteristics as well as the operation and maintenance parameters of the stormwater and wastewater management systems. It coheres with local regulations and international regulations of OACI (Organización de Aviación Civil Internacional). The plan also includes a detailed program of monitoring and water quality assessment (including parameters, frequency, location, quality assurance / quality control) and makes reference to spill prevention, training mechanisms and community consultation.</p> <p>The Stormwater Management System of the NQIA contains a System of Rainwater Harvesting that consists of open ditches, culverts, storm drains, a separate pool for Stormwater Management (which includes treatment), and a drainpipe to the Guayllabamba River. The collection system does not combine sanitary or industrial wastewater generated in the NQIA with stormwater. Stormwater management structures are designed to capture and repurpose more than 100% of on-site stormwater.</p> <p><u>Source:</u> Plan de manejo integrado de aguas lluvias, residuales sanitarias e industriales Nuevo Aeropuerto Internacional de Quito, Version 4. Abril 2011 // WALSH. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito. Mayo 2011 // Environmental Evaluation of Alternatives for Wastewater Pipeline NQIA</p>	<p>* Increase stormwater storage capacities of greenfields, greyfields and brownfields.</p>
		<p>Enhanced</p> <p>Although in the documentation presented, there is no specific mention of the use of pesticides, it is noted that organic fertilizers are produced in a special on-site composting area and are used for fertilize the airport gardens. The program for the production of organic fertilizer was created to take advantage of waste generated from garden debris and vermicomposting. A series of activities are specified for the production of organic fertilizer and an area for recycling has been designated at the north of the site.</p>	
		<p>2</p>	
<p>NW2.2 Reduce Pesticides and Fertilizer Impacts</p>			<p>*Operational policies for applying fertilizers and pesticides.</p> <p>*Include documentation showing the mix of pesticides and fertilizers to be used on the project</p>

		<p><u>Source:</u> WALSH. “Capitulo 8”. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito. Mayo 2011, 44 // Cardno ENTRIX. “2.11.2 Producción de Abono Orgánico”. Actualización del Plan de Manejo Ambiental Nuevo para Nuevo Aeropuerto de Quito. July, 2012.</p>	
<p>NW2.3 Prevent Surface and Groundwater Contamination</p>	<p>9</p>	<p>Superior</p> <p>Due to the lack of wastewater treatment in the Metropolitan District of Quito, rivers show high levels of contamination. However, the Guambi, Urvia and Guayllabamba rivers that surround the NQIA plateau are primarily groundwater fed and the surface water quality is generally good. Furthermore, due to the depth of the underground aquifers, they are not expected to become contaminated.</p> <p>However, to ensure that additional contaminants are not introduced into any contaminated or non-contaminated waterways, the NQIA has incorporated a rainwater management system with appropriate water treatment into its design. Hydrological testing of the streams by the WALSH company will help determine whether any negative effects of discharged runoff versus the baseline water quality are realized.</p>	<p>* Remediate existing levels of contamination in water bodies surrounding the project.</p>
		<p><u>Source:</u> Plan de manejo integrado de aguas lluvias, residuales sanitarias e industriales Nuevo Aeropuerto Internacional de Quito, Version 4. Abril 2011 // Peñafiel, Ródney. Plan para la Protección de la Contaminación de Agua Fase 2. Marzo 2010 // Cardno ENTRIX. Actualización de Plan de Manejo Ambiental Fase de Operación. Julio 2012 // WALSH. Plan de manejo ambiental – Fase de operaciones.</p>	
<p>NW3.1 Preserve Species Biodiversity</p>	<p>13</p>	<p>Conserving</p> <p>The Caraburo Plateau, on which the NQIA is built, is part of the northern dry forests located between elevations of 1400 and 2500 meters. The dominant vegetation is shrubby, thorny, xerophytes, and is predominantly home to acacia trees, cacti and animals that have adapted to the low-rainfall conditions. Precipitation ranges from 360 to 600 mm with annual temperatures between 18 and 20°C, thus making the site a special place both for its flora and its fauna.</p> <p>Due to the characteristics of this ecosystem and a commitment to have the least possible impact on the site, Quiport S.A. has done biological studies in the Caraburo Plateau since 2007 to assess the impact that the construction has had on the flora and fauna. These studies have determined which species are the most sensitive, endemic and/or representative of the area, with a specific focus on species diversity. Annual biological monitoring is also incorporated into the studies.</p> <p>Among the documents presented, the Environmental Management Plan recognizes that construction activities to develop the NQIA caused negative impacts to the flora and fauna of the Caraburo Plateau and adjacent areas. Moreover, the operating activities will generate noise which may result in the displacement of some species of wildlife - mostly birds - to the existing streams around the plateau. Thus, conservation of the stream habitats is vital because in the future they will likely be refuge for certain species.</p> <p>The area proposed as Protected Forest also has importance for conservation due to its geographical location, environmentally-</p>	<p>* Additional efforts to not only protect and upgrade existing habitats, but to restore and create new habitats</p> <p>* Improve and expand wildlife corridors, and link existing habitats.</p>

	<p>sensitive ecosystems, and plant and animal species; however, less is known regarding the ecology and conservation of this area.</p> <p>In addition, a Plan of Protection and Rescue of Sensitive Wildlife has been proposed and implemented. The plan describes a series of activities and measures for the protection and recovery of sensitive wildlife, and outlines strategies for mitigation of disturbed habitats, specifically in the case of the Burrowing owl[10] (Buho enterrador). The Plan aims to rescue endemic species, which are categorized as endangered on national and international lists, from within the NQIA area, and to relocate them to designated areas either outside of or within the Caraburo Plateau. To date, the nests of bird species, mainly the Burrowing Owl, have been relocated outside of the project area. The Plan also includes removal of foreign plant species and reforestation with endemic species to restore and improve the surrounding existing habitat.</p> <p><u>Source:</u> Corporación Quiport S.A. Informe Anual de Monitoreo Biológico Flora y Fauna Meseta de Caraburo 2011. Reporte Annual. Abril 2011 – Marzo 2012 // Cardno ENTRIX. Actualización del Plan de Manejo Ambiental Nuevo para Nuevo Aeropuerto de Quito. July, 2012 // Geo Management. Plan para la Protección de las Áreas Ambientalmente Sensibles del NAIQ. October 2008 // Informe Anual de Monitoreo del Búho Enterrador.</p>	
<p>NW 3.2 Control Invasive Species</p>	<p>11</p> <p>Restorative</p> <p>The project integrates active management plans designed to protect, rescue, and restore sensitive wildlife and to eliminate invasive species, both in fauna and flora. More specifically, rehabilitation of affected areas will include environmental restoration procedures such as a revegetation and landscaping plan using native species. This plan will be implemented in areas affected by the development of the construction activities of NQIA or other Quitport contractors. Permanent wildlife monitoring is performed on the airport site, especially in the ravines and remaining forested areas, to determine the wildlife populations, the conservation status of displaced species, and to better understand how wildlife interact with the project area, especially near the water storage facilities and operational areas (i.e. the runway). Monitoring of wildlife and vegetation during operations is essential to enable effective adaptive management and risk mitigation from the presence of wildlife in the NQIA area (i.e. bird collisions, risk of wildlife attracted to the water). Monitoring records can also be used as evidence of the actions taken to prevent collisions with wildlife during any legal procedure that may ensue as a result of such a collision. The annual report includes events of wildlife in the past year, analysis of the effectiveness of the wildlife management program, and suggested control procedures to reduce any new or significant risks to airport operations.</p> <p>An Ecological Compensation Plan was implemented to restore individual Acacia Macracantha carob trees affected during the construction process for the NQIA. This was the only native tree species identified as dominant and representative of the Caraburo Plateau. In addition, according to the airport’s Environmental Management Plan, stray dogs will be actively removed and discouraged from the area through the proper management of waste.</p>	<p>* Expand rehabilitation and restoration: Methods to restore habitats to pre-invasive state</p>

		<p><u>Source:</u> Cardno ENTRIX. “2.11.5 Plan de Protección y Rescate de Flora y Fauna Sensible / 3.10 Monitoreo Biotico.” Actualización del Plan de Manejo Ambiental Nuevo para Nuevo Aeropuerto de Quito. July, 2012 // Plan de Manejo de Control de Fauna.</p>	
<p>NW3.3 Restore Disturbed Soils</p>	<p>8</p>	<p>Conserving</p> <p>According to the documentation presented, the project considered a series of recommendations to restore 100% of the soils disturbed during construction, as well as land stabilization and erosion control measures to avoid construction-related problems. As a general consideration, earthwork required for the project was kept to the minimum necessary in the work areas. A cut and fill construction technique used which enabled reuse of on-site soil; no soil was imported or exported for the project.</p> <p>In regards to soil restoration activities, the first measure taken was the identification of existing erosive, unstable or potentially unstable areas along slopes and in fill locations. This enabled the implementation of case-specific geotechnical stabilization methods including but not limited to geogrids, reinforced earth walls, concrete bags, wall structures, drainage controls, slope breakings or simple revegetation. To control erosion and landslides caused by precipitation, specific actions were taken such as construction of gutters for stormwater management, creation of temporary channels to conduct surface water, installation of rainwater collectors, and the removal of any accumulated sediment as necessary.</p> <p>The rehabilitation plan also includes environmental restoration procedures that should be implemented in areas that have been affected by the construction activities of the NQIA. This plan will also be applied to abandoned areas either during the construction or operation phases. In addition, there is a revegetation plan that addresses both the NQIA in general, and the revegetation of approximately 2,400 acacia trees removed during the extension of the airport runway.</p>	<p>*Calculation showing that 100% of disturbed soils have been restored.</p> <p>*Documentation of the soil re-uses for functions comparable to their original function.</p>
		<p><u>Source:</u> Cardno ENTRIX. “2.3.4 Estabilización de Suelos y Control de Erosión.” Actualización del Plan de Manejo Ambiental Nuevo para Nuevo Aeropuerto de Quito. July, 2012 // WALSH. “8.4 Plan de Prevención y Mitigación de Impactos. Estabilización de Suelos y Control de Erosión”. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del NQIA. May 2011</p>	
<p>NW3.4 Maintain wetland and surface water functions.</p>	<p>15</p>	<p>Conserving</p> <p>Conservation of the surface water functions of the stream systems located in the surrounding ravines as well as the surface and underground riverbed drainage systems is a main concern of this project. Several studies have been done in order to maintain or enhance hydrologic connections, water quality, surrounding habitat areas, and to restore sediment transport.</p> <p>The location of the project both avoids infringement upon the natural water flows and restores disturbed functions to prior levels by including a wastewater treatment plant to treat and reuse water. In addition, an exhaustive water monitoring process has been carried out during the construction and operation phases of the project to ensure that the project fully restores disturbed functions in the existing ecosystem.</p>	<p>* Documentation showing how water quality will be maintained or enhanced.</p> <p>* Documentation demonstrating that sediment transport will not be disrupted by the proposed project.</p> <p>* Documents for a professional team outlining strategies for ecosystems and a description of a</p>

		<p><u>Source:</u> Cardno ENTRIX. “Cap: 2” Actualización del Plan de Manejo Ambiental Nuevo para Nuevo Aeropuerto de Quito. July, 2012 // WALSH. “Cap:3”. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del NQIA. May 2011 // WALSH. “Cap: 4”. Décimo Informe de Monitoreo Bianual de Biodiversidad y Calidad de Agua de las Quebradas que rodean el el NAIQ: Fase de Construcción, Época Lluviosa - Diciembre 2011. February, 2012 // Geo Management. Plan para la Protección de las Áreas Ambientalmente Sensibles del NAIQ. October, 2008 // Programa de monitoreo hidrológico e hidrogeológico en la meseta de Caraburo, 2010-2011 // Plan de manejo integrado de aguas lluvias, residuales sanitarias e industriales Nuevo Aeropuerto Internacional de Quito, Version 4. Abril 2011</p>	restoration plan.
NW 0.0 Innovate Or Exceed Credit Requirements	0	N/A	
	124		

CLIMATE AND RISK			
	NEW QUITO INTERNATIONAL AIRPORT, ECUADOR		RECOMMENDATIONS
CR1.1 Reduce Greenhouse Gas Emissions	4	<p>Improved</p> <p>RWDI AIR Inc. (RWDI) conducted an air quality assessment of the proposed and projected operations at NQIA for 2010, 2020 and 2030 in a 20 by 20 km study area. This is the area in which potential air quality effects from airport operations may occur. Among other air pollutants, carbon dioxide (CO2) was included in the assessment.</p> <p>In relation to air contaminant sources in the NQIA, aircraft are the largest contributor to emissions of all common air contaminants, contributing 82% to 96% of all emissions. The modeling for 2020 and 2030 shows an increase in concentrations that is essentially based on a predicted increase in air traffic. The modeling assumes that some improvements in emissions are made as older aircraft are replaced with newer aircraft; however, it is not possible to predict the specific changes that may occur in 10 or 20 years, so the approach taken focuses on a worst case scenario.</p> <p>The studies conducted establish a comprehensive life cycle carbon assessment, considering a period of 30 years, but no actions or strategies are suggested to reduce the anticipated amount of greenhouse gas emissions. It is recommended that the project use the data already gathered to implement future actions to reduce CO2.</p>	* Documentation of efforts to reduce carbon emissions and percentage reduction.
		<p><u>Source:</u> WALSH. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito. Mayo 2011. Cap: 3, pp: 64 -73 // RWDI Consulting engineers and scientists. Air Quality Assessment of the New International Quito Airport in Ecuador. January 26, 2009 // Corporación Quiport S.A. Política de calidad de aire.</p>	

<p>CR1.2 Reduce Air Pollutant Emissions</p>	<p>2</p> <p>Improved</p> <p>The following air pollutants were considered in the NQIA air quality assessment: Carbon Monoxide (CO), Volatile Organic Compounds (VOCs), Oxides Of Nitrogen (NOx), Sulfur Dioxide (SO2), and Particulate Matter (PM).</p> <p>The results of the modeling determine future scenarios in which the level of Nitrogen Oxide (NOx) exceeds the limits established Ecuadorian Air Quality Norm. In order to minimize the polluting impact planned Quiport SA developed a "Strategy for Reducing Emissions of Nitrogen Oxides (NOx) for the NQIA" which provides realistic mitigation measures and strategies.</p> <p>Ambient air quality objectives established by the Ecuador Ministry of Environment (Ministerio del Ambiente) are listed in Table 1-1, along with the air quality limits included in the Common Terms Agreement (CTA) between Quiport and the lenders. But the standards set for the project differs from the ones established by the California Ambient Air Quality Standards (CAAQS). Because, even though if the analyzed contaminants accomplished the permitted levels defined by the CAAQS, two contaminants are missing in the analysis: Lead and Ozone.</p> <p>Is relevant to mention that the background air quality concentrations at the proposed airport will be lower than at the existing airport's urban setting. Aircraft efficiency is much improved at the proposed location due to the lower elevation. This will translate into fewer emissions per unit of takeoff weight than at the existing airport. Inherently, the overall air quality in the vicinity of the proposed airport will be preferable to air quality around the existing site – assuming an equal tonnage of air traffic and associated road traffic.</p> <p><i>Source: RBDI Consulting engineers and scientists. Air Quality Assessment of the New International Quito Airport in Ecuador. January 26, 2009 // Laboratorio AMBIGEST Cia. Ltda. Monitoreo de la Calidad del Aire Quiport. Julio 2013 // Proyecto: Estrategia para la Reducción de Emisiones de Óxidos de Nitrógeno (NOx) para el Nuevo Aeropuerto Internacional de Quito (NAIQ). Enero, 2009</i></p>	<p>* Documentation of expected emissions of the six criteria pollutants. Dust, ground level ozone, carbon monoxide, sulphur oxides, nitrogen oxides, lead and noxious odors</p>
<p>CR2.1 Assess Climate Threat</p>	<p>0</p> <p>No Score</p> <p>Considering the imminent threat of climate change and extreme weather conditions around the world, better preparedness to confront these circumstances should be considered in the design of any project. This is specifically relevant in the case of airports and other infrastructure projects which play an important role in communication.</p> <p>No information was provided regarding a climate impact assessment or adaptation plan that identifies climate change risks and possible responses for the NQIA. Such a plan should consider risks and possible changes in operating conditions in case of higher temperatures, increased frequency and intensity of storms, increased or extended floods, and should outline strategies for recovery. Such a plan could help extend the lifespan of the facility.</p> <p><i>Source: not provided</i></p>	<p>* Documentation that prove that a Climate Impact Assessment and Adaptation Plan has been completed.</p> <p>*Documentation of community outreach during the process.</p>

<p>CR2.2 Avoid Traps And Vulnerabili ties</p>	<p>0</p>	<p>No Score</p> <p>No assessment was conducted to detect potential long-term traps, vulnerabilities and risks due to long-term changes. Therefore, the project has not achieved this credit. However, certain vulnerabilities, such as increases in air pollution and road congestion, linked to the project have been identified and represent clear opportunities for future improvement.</p> <p><i>Source: not provided</i></p>	<p>*Documentation to identify and reduce potential risks taps and vulnerabilities.</p>
<p>CR2.3 Prepare For Long- Term Adaptabilit y</p>	<p>0</p>	<p>No Score</p> <p>Infrastructure systems should be prepared to handle the consequences of long-term climate change in order to maintain adequate performance under altered climate conditions and to adapt to other future scenarios.</p> <p>To achieve a better level of resilience, the project could prepare plans and designs addressing long-term climate change and its consequences, such as extreme weather events, water scarcity, extended droughts and increased ambient temperature.</p> <p>Strategies to manage long-term changes may include: structural changes to expand the range of conditions in which the system can function, decentralized systems, natural systems, alternative supply option, adaptive capabilities, and site selection.</p> <p><i>Source: not provided</i></p>	<p>*Identification of specific measures taken to address the potential consequences of long-term climate change.</p> <p>*Identification of specific measures to prevent desertification, water and energy shortages or other critical materials.</p> <p>*Plans, design, documents that show restoration and rehabilitation efforts.</p>
<p>CR2.4 Prepare For Short- Term Hazards</p>	<p>10</p>	<p>Superior</p> <p>Short-term risks are properly considered and identified for all phases of the project, but long-term risks such as climate change are only partly identified and addressed over the lifespan the project.</p> <p>The project is located in a seismic hazard area, therefore the airport structure has been designed to resist seismic activity and minor damages caused by an earthquake of Ms> 7 with a 475-year rate of return. Design considerations are complemented by evacuation routes and emergency protocols. Short-term risks during the construction phase include fires, explosions, accidental spills, transit accidents, labor accidents, and seismic hazards. Plans and protocols are established to respond to each of these events.</p> <p>For the operational phase, the risk of spills of hazardous substances such as fuel and hydrocarbons has been considered. Proper protocols will be followed by qualified personnel in the event of accidental spills. In addition, protocols to minimize accidental spills of fuel, hydrocarbons, and other chemical products have been established.</p> <p>To avoid flooding and landslides, an integrated water collection system was designed. However, considering recurrent weather phenomenons such as El Nino, which can generate very high rainfall in areas of low average precipitation, the water collection system should be augmented in the future. The project team could expand the existing native species reforestation program.</p>	<p>* Provide a complete list of the strategies incorporated into the project to safeguard against these natural hazards.</p> <p>*Explanation of the strategies including how to cope with the expected hazards</p> <p>*Documentation on how minimize the risk of future hazards using environmental restoration</p>

		<p><i>Source: WALSH. Adendum al Estudio de Impacto y Plan de Manejo Ambiental del Nuevo Aeropuerto Internacional de Quito. Mayo 2011. Cap: 8 pp: 11 - 14 // NQIA. Plan de Prevención y control de derrames. Marzo, 2012 // Cardno ENTRIX. Actualización del Plan de Manejo Ambiental Nuevo para Nuevo Aeropuerto de Quito. July, 2012 // Geo Management. Plan para la Protección de las Áreas Ambientalmente Sensibles del NAIQ. October, 2008 // Plan de manejo integrado de aguas lluvias, residuales sanitarias e industriales Nuevo Aeropuerto Internacional de Quito, Version 4. Abril 2011 // De la Torre Francisco. Impacto del medio físico al proyecto. Environmental Impact Assessment NQIA. pp. 64</i></p>	
CR2.5 Manage Heat Island Effects	0	<p>No Score</p> <p>The airport contains many impervious surfaces and large paved areas with high solar reflectance. It is important to consider that the cumulative impact of the heat island effect across large areas can alter the immediate microclimate and contribute to larger climate-related impacts. This can lead to an increase in energy consumption for cooling, have negative effects on local vegetation, wildlife and communities.</p> <p>In order to reduce localized heat accumulation and manage microclimates, several strategies that minimize surfaces with a high Solar Reflectance Index (SRI) could be integrated into the project design. For example, the project could maximize shaded surfaces, use lighter color materials on roofs, or establish green roofs.</p> <p><i>Source: not provided</i></p>	<p>*Documentation of the different buildings and surfaces of road built.</p> <p>*Calculations to demonstrate the energy absorbed and the increase of temperature in those areas.</p> <p>* Define and apply strategies to reduce heat producing surfaces.</p>
CRO.0 Innovate Or Exceed Credit Requirements	0	N/A	
	16		

OVERALL:	299	NEW QUITO INTERNATIONAL AIRPORT, ECUADOR
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APPENDIX D: SOURCES

DOCUMENTATION PROVIDED.
General Information.
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