Chapter 2

Sustainability Framework

Table of Contents

List of Tables

2. Sustainability Framework

2.1 Sustainability and Sustainable Development

The concept of "sustainable development" or "sustainability" is a complex one that has been described in many different ways by many jurisdictions around the world. Perhaps the best known and most widely accepted definition of sustainable development comes from the 1987 Brundtland Commission Report - Our Common Future: *"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."*

This definition was incorporated into the *Canadian Environmental Assessment Act* (CEAA) when it was established in 1995. It was the first piece of Canadian legislation to define sustainable development, which is a guiding principle of the CEAA. This definition also appears in the Canadian Environmental Assessment Agency's (the Agency's) 2007-2009 Sustainable Development Guide.

The Agency's 2004-2006 Sustainable Development Guide explains further that: *"Sustainable development recognizes that social, economic and environmental issues are interconnected and must be equally integrated into the decision-making process, both with regard to when they are considered and how they are balanced against each other."*

With respect to the management of airports, the Airport Cooperative Research Program (ACRP) defines sustainability as "*practices that ensure:*

- *Protection of the environment, including conservation of natural resources*
- *Social progress that recognizes the needs of all stakeholders*
- *Maintenance of high and stable levels of economic growth and employment"*

Section 2.1 provides a sustainability framework, to which the Authority has committed for the PRP. This framework was used to incorporate sustainability measures into the PRP and sustainability initiatives into the CS of the PRP. Section 2.2 describes the process used to select specific measures to improve the sustainability of the Project. Measures that are determined to be feasible for the PRP are listed in tabular form. Section 2.3 provides an assessment of the effects of the PRP on the capacity of renewable resources to meet the needs of future generations.

2.1.1 Incorporating International and Federal Guidance

The International Civil Aviation Organization (ICAO), through its Committee on Aviation Environmental Committee (CAEP), identifies sustainability standards and recommended practices relevant to airports and aviation in general. The airport industry receives direction on these standards and practices through various regulatory authorities and their industry association, Airports Council International (ACI). A number of airports around the world have implemented these practices. Some have been initiated voluntarily, while others have been required under state or local ordinances. Under ACI, the Sustainable Aviation Guidance Alliance (SAGA) has undertaken an effort to consolidate existing guidelines and practices into a comprehensive, searchable resource that can be tailored to the unique requirements of individual airports of all sizes and in different climates/regions (SAGA 2010). This database provided a long list of sustainability measures that were considered for the PRP.

In 1995, Canada's Parliament passed amendments to the *Auditor General Act* that included the creation of a legal requirement for 25 federal departments and agencies to prepare and table sustainable development strategies in Parliament every three years. Four other organizations, including the Agency, table their sustainable development strategies on a voluntary basis. The strategies are intended to outline the objectives and plans of each department and agency to further sustainable development within its area of responsibility.

Transport Canada's 2007-2009 Sustainable Transportation Strategy is relevant to the Authority's PRP as it is the department that sets aviation and airport regulatory standards and monitors compliance, as well as enforces all airport safety/security standards and owns airport lands. In its strategy, Transport Canada's vision of sustainable transportation systems is *"one that integrates and finds the right balance among social, economic and environmental objectives"*. Transport Canada identified the following transportation-related sustainability principles:

Social:
- *Safety, Security and Health*
- *Access and Choice*
- *Quality of Life*

Economic:
- *Efficiency*
- *Cost Internalization*
- *Affordability*

Environmental:
- *Pollution Prevention*
- *Environmental Stewardship*
- *Protection and Conservation*

Management:
- *Leadership and Integration*
- *Precautionary Principle*
- *Consultation and Public Participation*
- *Accountability*

The Agency's 2004-2006 Sustainable Development Strategy is relevant to the PRP CS as it is the agency that administers the CEAA (the environmental assessment (EA) process the Authority models its EA program after), provides leadership and serves as a centre of expertise on EA. For example, one initiative identified in the Agency's strategy includes clarifying the relationship between sustainable development and EA.

The Authority used the SAGA database and Transport Canada's and the Agency's strategies as guidance for incorporating sustainability principles into the PRP.

2.1.2 Sustainability at Calgary International Airport

2.1.2.1 2009 Accountability Report

The Authority's 2009 Accountability Report summarizes its commitments to sustainability. It reads as follows:

"Employee Engagement

The Authority will strive to create a culture of accountability whereby employees are engaged and supported in meaningful work that complements the objectives of the organization. This will include competitive salaries and benefits, flexible work schedules and training and professional development opportunities. Together, we will pursue our mandate with commitment, integrity and professionalism.

Health and Safety

The Authority is committed to maintaining a workplace health and safety system comprised of programs, procedures, standards, performance measurements and initiatives to ensure compliance with the law and to protect Authority staff, volunteers, contractors, visitors and other users of Airport facilities. We partner with others in developing initiatives and enhancements to our Safety Management System. Our goal is to meet or exceed recognized industry standards in workplace health and safety. At The Calgary Airport Authority, an all-encompassing safety culture is the foundation of responsible management and safe airport operations.

Emergency Preparedness

The Authority has a comprehensive emergency response plan that involves support from the Calgary Fire Department, Calgary Police Service, Emergency Medical Services and others. In cooperation with airport partners, we regularly conduct simulated and live training exercises to test emergency response and operational contingency plans.

Facility Restoration and Development

The Authority will ensure all assets are maintained and restored in a manner that provides reasonable assurance that systems will perform as expected and reach their serviceable life expectancy. Facility planning and development will be organized and undertaken in a responsible and prudent manner to provide adequate capacity to meet marketplace requirements.

Financial Operations

The Calgary Airport Authority will conduct its financial planning and operations so as to remain a viable corporation over the long term and will:

- *Pursue efficiency and effectiveness in all operations and activities;*
- *Balance the needs of airport stakeholders in all resource decisions; and*
- *Only undertake facility expansion that is consistent with our financial capabilities.*

Community Involvement

The Calgary Airport Authority believes that community involvement is integral to our long-term success. Ongoing corporate and employee support is provided to the United Way, the Aviation Interfaith Ministry, Dreams Take Flight and many other community-based organizations. Each year, over 8,000 students participate in educational programs at our SpacePort facility located in the Air Terminal Building and we are proud to be a significant sponsor of Rotary Challenger Park, a barrier-free multi-sport facility located on airport lands. Each month we prepare and serve dinner to guests at the Mustard Seed's Foothills shelter facility. We participate in

the mayor's annual Environmental Expo and employees participate in the Calgary Commuter Challenge, utilizing alternative transportation methods.

The Environment

The Calgary Airport Authority is committed to protecting the environment and operates Calgary International and Springbank airports to serve the community in a safe, secure and efficient manner while protecting the quality of the environment.

We will:

- *Ensure, at minimum, that all practices conform to relevant federal, provincial and municipal laws;*
- *Promote environmental awareness among Authority employees and all airport service providers;*
- *Provide appropriate environmental training for Authority staff;*
- *Maintain active communication regarding environmental issues;*
- *Subject all new airport construction projects to an environmental review process;*
- *Maintain plans and procedures to deal with environmental emergencies and take immediate corrective action in the event of an incident;*
- *Promote sustainability in the application of our Environmental Policy through continual improvement;*
- *Conduct regular audits and reviews to assess the environmental condition of the airports and facilitate preventative and corrective measures; and*
- *Strive to be a leader of sound environmental management for airports.*

Airports are a component of the worldwide aviation industry and can influence a number of environmental factors; however, airports do not control the noise or emissions from aircraft. The United Nations Intergovernmental Panel on Climate Change estimates that worldwide aviation contributes 2% of the world's greenhouse gas emissions. Environment Canada estimates that domestic aviation accounts for 1.2% of total Canadian greenhouse gas emissions. Aircraft fuel efficiency has improved significantly in the past 10 years and air carrier and aircraft manufacturer initiatives for continuing improvements include:

- *Moving to more fuel-efficient aircraft;*
- *Optimizing the weight carried to reduce fuel burn;*
- *Developing more efficient air traffic operations; and*
- *Developing alternative fuels.*

The Authority has a number of comprehensive environmental programs, which are briefly summarized as follows:

- *An Environmental Assessment Program that evaluates all airport construction projects;*
- *A Noise Management Program that aims to balance the Calgary Region's need for safe, efficient and convenient air service with enjoyable city living;*
- *A Water Quality Program that focuses on protecting surface and ground water and ensuring that sensitive aquatic habitats are not compromised;*
- *A Hazardous Materials Program that ensures all related material is handled in a safe and environmentally conscious manner;*
- *A Wildlife Management Program to reduce the risks associated with birds and mammals;*
- *An Air Quality Management Program that aims to educate and reduce emissions of pollutants; and*
- *A Recycling Program with the objective of maximizing the amount of Authority and tenant garbage and construction waste recycling."*

The Authority's commitments to sustainability were considered in the planning and design of the PRP.

2.1.2.2 Environmental Assessment

The Authority has a well-established practice of sustainable development at Calgary International Airport (YYC). For example, the Authority conducts EAs of its projects according to guidance set out in the CEAA. The Authority is the decision-making Authority and is charged with full consideration of the environmental effects of YYC projects (see Volume II, Chapter 5 for more detail). Furthermore, the Authority's 2004 Strategic Environmental Assessment of YYCs 2004 Master Plan included an assessment of the new parallel runway. The results of this assessment were also considered in the CS of the PRP.

2.1.2.3 Environmental Management System

The Authority has a variety of standards and programs in place to assist them in achieving its goal that airport operations occur without significant adverse effects on human health and the environment. The Authority has a well established Environmental Management System (EMS) which includes a wide range of programs dealing with specific areas such as bird and wildlife control, noise management, aircraft de-icing, and the management of underground storage tanks. For more information, see the Authority's website at http://www.yyc.com.

In addition, the Authority undertakes flight tracking and noise monitoring as part of its overall environmental program. Chairing the Airport Community Noise Consultative Committee (ACNCC) forms part of the overall program. This Committee comprises community residents, as well as representatives from key stakeholder groups such as Transport Canada, NAV CANADA, airlines, and municipal planning departments. The Committee typically meets semi-annually and acts primarily as an information forum between the above groups on matters related to airport noise.

2.2 Parallel Runway Project Sustainability Framework

The sustainability framework for a given project at YYC is guided by the Authority's policies (see section 2.1.2.1 of this chapter). Sustainability initiatives and measures are developed at workshops and through consultation between the Authority, those designing the project, the individuals producing the EA, and the stakeholders who have participated in the public consultation process. The sustainability measures that were developed as part of the EA process for the PRP were developed in the context of the entire airport operation, the Triple Bottom Line approach to sustainable decision-making, as well as measures that have been implemented at other large airport developments around the world.

In keeping with the 2004 Master Plan approach to sustainable airport planning, the PRP sustainability framework began with a workshop to define how sustainability was to be applied to the Project. This initial workshop for the PRP was held on 9 April, 2009. A second workshop was held on 25 January, 2010. The objectives of this workshop were to: 1) refine the approach to the PRP sustainability framework, 2) review sustainability measures at other airports and consider their applicability to the Project, and 3) populate a table of sustainability measures for the PRP. Many working sessions were also held with the Authority to organize this table and refine the proposed PRP measures.

In its 2004-2006 Strategy, the Agency identified several steps for creating a sustainable development strategy with respect to the federal EA process. Those initiatives, which are listed below, are also being implemented as part of the PRP CS:

- **Project Registry Website** - to provide the public with complete, accurate and timely information regarding the PRP CS

- **Participant Funding Program** - to provide financial assistance to members of the public and organizations to prepare for, and participate in, the PRP CS
- **Follow-up Program Repository** - available on the Project Registry Website, to contribute to building the knowledge base to improve future predictions and to identify situations where mitigation measures need to be adapted to meet unforeseen circumstances.

Finally, in terms of biological resource sustainability and in accordance with the Canadian Biodiversity Strategy (1994), the PRP will not have significant adverse effects on biodiversity at the genetic, species, landscape or ecosystem levels (refer to Volume III, Chapter 4 and Chapter 6).

2.2.1 Parallel Runway Project Sustainability Measures

Sustainability measures were established and evaluated during the CS. A long list of potential measures for consideration was obtained from a number of sources, including measures undertaken at other airports, other Authority projects including the International Facilities Project, and the Sustainable Aviation Guidance Alliance (SAGA) database.

Each of these measures was considered at the January 2010 workshop. At the workshop, the technical and economic feasibility and sustainability of each of the measures was assessed, with the objective of establishing a list of measures that would become an integral part of the design and construction of the PRP. This list is shown in Table 2-1. Each sustainability measure was categorized as relevant to Design, Construction, or YYC's EMS. The measures were also tied to the relevant implementation documentation (i.e., Design Specifications, ECO Plan, Stormwater Management Plan, and Earthworks Management Plan). Some of the measures were directly related to the construction activities and others related to the operation of the runway and associated facilities. Discipline-specific mitigation measures identified through each respective effects assessment are also included in this table. The presentation of the sustainability framework separates the measures associated with the construction from those that are ongoing and subject to continuous improvement once the facilities are in operation.

A significant component of the CS was to develop and recommend mitigation measures to eliminate or reduce the environmental effects of the development. In many cases, the mitigation measures to be undertaken were also considered elements of the sustainability framework; however, the consideration of sustainability goes beyond basic mitigation and beyond the intention to simply reduce the potential environmental effects. The sustainability measures stem from the intent to conduct the activities of construction and operation of the airport in a manner that seeks to reduce the overall impact on the environment, while reducing consumption of resources and maximizing the social and economic benefits of the facility.

The sustainability measures identified and commitments made with respect to the PRP will be integrated into the Authority's existing EMS and its broader campus-wide sustainability program which is currently being developed.

2.3 Capacity for Renewable Resources

The CEAA process requires the assessment of the capacity of renewable resources present within the Local and Regional Study Area, and how those may be affected by the Project.

Natural resources are defined as elements and materials which make up the earth and are available to be used for commercial or social gain. Natural resources can either be exhaustible or renewable. An exhaustible natural resource is one that once used cannot be replenished or recover naturally. This can

include minerals, base metals, fossil fuels, and rocks. Soil can also be an exhaustible natural resource if managed inappropriately. Renewable resources are those that have the potential to recover or replenish through natural or other processes. These can include water, wind, solar, soil, land, trees, and wildlife. The capacity for renewable resources refers to the quantity which can be consumed, harvested or removed in any period of time without reducing the stock of the resource available in the next period of time.

The renewable resources of most concern in regards to the PRP include:

- Wildlife populations (e.g., hunted and trapped populations)
- Soils, in particular black topsoil
- Vegetation
- Water
- Hydro-electric power
- Wind power
- Solar power

2.3.1 Wildlife Populations

Wildlife populations can be considered a renewable resource. Some mammals have been traditionally trapped or hunted for their fur (e.g., foxes, beavers, and weasels). Some game animal populations (e.g., deer, elk, antelope, and moose) are managed and hunted in southern Alberta. It is anticipated that the development of the PRP will have no significant impact upon the wildlife populations within the region (Volume III, Chapter 6). It should be noted that there is no recreational or commercial hunting occurring on YYC lands. Due to the large amount of urban development in the region, it is unlikely that commercial or recreational hunters utilize this area. On this basis, the primary concern is adverse effects upon populations of commercially valuable fauna at a regional or provincial scale. It is demonstrated in Chapter 4 of this Volume that there will be no significant effect on the regional populations of fauna species. On this basis, it is reasonable to conclude that there will be no significant effect on the capacity of this resource.

2.3.2 Soils

Soils can be either exhaustible resources or renewable depending on the period of time that is available for the quantity consumed to become available again, and the management and conservation practices that are in place. If abused, depleted or allowed to erode, it may take 300 to 500 years to develop one inch of topsoil. In the case of the PRP, due to proposed earthworks management and the nature of the development, soils are considered a sustainable resource in a local context. Topsoil quantity and quality are not reduced, and will be reused as a productive growth medium for local application now and into the future. The topsoil, where present within the PRP LSA, include Chernozems that occur in only one other region on the planet (Russia) and could be considered a finite resource rather than a renewable one. Adherence to the Authority's Earthworks Management Plan and the mitigation measures set out in Volume III, Chapter 3 will result in the maintenance of soil quantity and quality. However, a small percentage reduction in the area covered by Chernozems soil is unavoidable.

2.3.3 Vegetation

Vegetation provides a resource for harvesting which can recover if sustainably managed. Generally when discussing vegetation as a renewable resource, consideration is given to the forests and potential timber that can be utilized. Approximately 60% of Alberta is covered in forests and the forestry industry

employees 50,000 jobs annually (ASRD 2009). The majority of forests in Alberta are valuable sources of timber and it is important that this resource be maintained. The PRP is within the prairie of Alberta where there are few forests. Those trees that would be classed as marketable timber are not naturally occurring and have been planted for ornamental purposes. These trees do not represent a natural renewable resource. The PRP will not impact upon the forests of Alberta in a fashion that would reduce the capacity of this resource. With regard to the native grasslands, the range is and has historically been under pressure from a variety of sources for much of the past 100 years. To all practical purposes, it too now represents a finite resource. Rangelands can continue to perform their natural ecological processes and functions until reduced to a point at which they are irreversibly impaired. The rangeland prairie communities in the LSA have already been irreversibly disturbed and, therefore, the development of the PRP will not further reduce the carrying capacity of this resource from current conditions.

2.3.4 Water

Well managed and conserved water resources can be considered renewable. Water is one of the most important renewable resources as it is a necessity to life. Nose Creek which is adjacent to the PRP site discharges into the Bow River, which is the primary watercourse in Calgary. The PRP is governed by a Stormwater Management Plan that will ensure that the VCs of water quality and water quantity will not impact the inflow stream needs of Nose Creek or the Bow River, neither during construction nor operation or decommissioning of this runway project. On this basis, it is fair to conclude that the PRP will not affect the capacity of this resource within the LSA or RSA.

2.3.5 Hydroelectric Power

There are a number of hydroelectric plants on the Bow River System. In 2004, there were eight plants generating 169 MW of power (Canadian Hydro Power Association 2003). This renewable energy resource provides a moderate contribution to the Alberta power grid. Due to the management of resources of the PRP, there will be no significant effect on the flow in the Bow River. Given that a number of the plants are upriver of the discharge point for Nose Creek and that there will be no significant increase in flow, it can be concluded that the PRP will not have any effect on the carrying capacity of hydroelectric power.

2.3.6 Wind Power

Wind energy is a renewable resource which has undergone considerable advances in technology in recent decades. All wind farms in Alberta are located south of Calgary and there are no wind farms within 100 km of the PRP site. The design and nature of the PRP will not influence the prevailing winds passing through the area in any way. The carrying capacity for wind in Alberta is currently much higher than that being consumed. It is considered on this basis that the PRP will not have any adverse effects on the capacity for wind to be consumed as a resource in Alberta or Canada.

2.3.7 Solar Power

Just as it infers, solar power is electricity derived from sunshine. The photo voltaic process converts into electrical energy or heat. This resource is considered renewable as it is entirely dependent on the sun and the sun is considered to be a resource which will not diminish in the foreseeable future. The PRP will not affect the capacity of this renewable resource. All new structures and buildings are to be developed such that they are compatible with solar energy systems should it become a more efficient and economically viable resource.

The PRP is unlikely to have a significant effect on the capacity of any of the renewable resources which occur within the site. The disturbed nature of the existing site and its location within the region coupled with the design and scale of the development ensure that the carrying capacity of all renewable resources both within the LSA, the RSA and the Province will not be reduced or adversely affected.

Table 2-1 PRP Sustainability, Mitigation, or Mitigation-by-Design Measures

	Sustainability, Mitigation, or Mitigation-by-Design Measure	Design	Construction	EMS	EWM Plan	SWM Plan	ECO Plan	BMP (Already Being Implemented/Will be Implemented)	Under Consideration Pending Further Evaluation
	Soils								
1	The use of effective erosion control and sediment interception measures. Revegetation efforts will be used to control erosion (wind/water) and limit the spread of weeds and invasive species. Ensure consistency with stormwater management for construction activities.		✓		✓		✓	✓	
1a	Incorporate temporary sedimentation basins, temporary ditch checks, diversion dikes, temporary ditches, sediment traps, silt fences, and/or pipe slope drains into construction plans.		✓		✓		✓	✓	
1b	Incorporate temporary and permanent soil stabilization techniques including drill seed, soil binders, straw mulch, and wood mulch. Install rolled mats (organic, biodegradable mulch mats used to reduce erosion) and ensure that they conform to site contours. Develop vegetation establishment specification.		✓		✓		✓	✓	
1c	Achieve permanent soil stabilization in seeded areas by covering all exposed soil surfaces with vegetation. Do not use vegetation that may attract wildlife or impact the safety of aircraft operations on or adjacent to airport operating areas.		✓		✓		✓	✓	
1d	Use natural fibre geotextiles (permeable fabrics) that are biodegradable.		✓		✓		✓	✓	
1e	When using vegetation to stabilize soils, make sure a layer of topsoil is present to support growth.		✓		✓		✓	✓	
1f	Protect storage areas and stockpile areas as noted in the ECO Plan.		✓		✓		✓	✓	
1g	Salvaged operations should be performed with multiple passes to minimize topsoil loss or degradation.		✓		✓		✓		
1h	Minimize the duration in which erodible topsoil/subsoils (i.e., medium-textured, silty soils) are exposed and stabilize soil stockpiles exposed for extended periods (> 6 months).	✓	✓		✓		✓		
2	Locate construction lay-down areas and stockpiles on areas that will be paved as part of the construction.		✓		✓		✓	✓	
2a	Topsoil and spoil salvage, stockpiled for use in future YYC projects, should be separated by a minimum of 1.0 m to avoid potential mixing associated with soil feathering.		✓		✓		✓		
2b	Unsuitable topsoil and subsoils should be stockpiled separately at pre-determined locations, in an effort to limit degradation of resident and reclamation soils. Designated long term reclamation sites for the storage of problem soils include new and existing YYC stormwater management ponds, sound attenuation berms and their surrounding landscapes.		✓		✓		✓		

	Sustainability, Mitigation, or Mitigation-by-Design Measure	Design	Construction	EMS	EWM Plan	SWM Plan	ECO Plan	BMP (Already Being Implemented/Will be Implemented)	Under Consideration Pending Further Evaluation
2c	New and existing YYC stormwater management ponds, sound attenuation berms and their surrounding landscapes have been designated as long term reclamation sites for the storage of problem soils.		✓		✓		✓		
3	Clearly mark, in advance of construction, those areas of the PRP footprint where contingency soils handling measures may be required.		✓		✓		✓		
4	A qualified Environmental Inspector is recommended to direct soil stripping, salvage and stockpiling operations, and generally guide equipment operators during preparation of the PRP site.		✓		✓		✓		
5	Soil conservation measures will be implemented.		□		✓		✓		
5a	Topsoil stripping will be restricted in areas of unsuitable soils.		✓		✓		✓		
5b	If construction does occur during unsuitable soil conditions, additional construction effort may be required to avoid unnecessary mixing of topsoil and subsoil.		✓		✓		✓		
5c	Mitigation at the project planning and construction phase will focus on the delineation of those areas requiring alternative soils handling methods.		✓		✓		✓		
5d	Construction techniques employed during soil stripping, salvage and stockpiling will be designed to minimize admixing of saline subsoils with topsoils, thus promoting the maintenance of reclamation suitable for replacement topsoils.		✓		✓		✓		
5e	Stripping of topsoil and subsoil will be restricted in areas of unsuitable, problem soils (saline/sodic soils, heavy clay soil and wet soil conditions) and, where required, directed by the Environmental Inspector.		✓		✓		✓		
6	Any excess soil from the IFP will be reused as fill for the PRP.		✓		✓		✓		
	Soils Follow Up and Monitoring								
7a	The proponent has committed to defining a soil management program (i.e., Calgary Airport Authority Earthworks and Soil Management Guidance Document) for application on the PRP and campus wide.						✓		
7b	Soil stockpiles will be monitored during the first growing season to ensure adequate revegetation and erosion protection.						✓		
7c	Monitoring of temporary, interim reclamation measures to ensure reclamation success.						✓		
7d	Motoring of all phases of reclamation process is required to ensure landscape objectives are met.						✓		
	Groundwater								
1	Porous pavement and other infiltration structures should be implemented to maintain groundwater and base flows in this region.	✓							

	Sustainability, Mitigation, or Mitigation-by-Design Measure	Design	Construction	EMS	EWM Plan	SWM Plan	ECO Plan	BMP (Already Being Implemented/Will be Implemented)	Under Consideration Pending Further Evaluation
2	All existing water wells, gas wells and boreholes on the PRP area that cannot be preserved will be identified, inspected and effectively sealed with grout.	✓	✓				✓		
3	Contractor to provide proper treatment for construction dewatering operations.		✓				✓	✓	
	Groundwater Follow Up and Monitoring								
4	Groundwater elevations have been measured several times a day in three monitoring wells in the LSA since the summer of 2009, using transducers and dataloggers; this will continue.						✓		
4a	Groundwater level monitoring near underpass excavations will be completed to measure the effects of underpass dewatering before, during and after underpass construction.						✓		
4b	If spills of fuel or chemicals occur during construction or operations, then additional groundwater quality monitoring may be required in localized portions of the LSA to assess compliance with applicable water quality criteria.						✓		
	Vegetation								
1	Incorporation of PRP vegetation management into the YYC Vegetation Management Program.			✓					
1a	Minimal disturbance construction techniques will be adopted in areas that will not be graded.		✓				✓		
1b	A qualified environmental inspector will direct vegetation clearing and removal operations, and guide equipment.		✓				✓		
1c	Construction will be scheduled to occur in accordance with favourable environmental (weather) and site/soil.		✓				✓		
1d	The Authority will avoid vegetation clearing and removal with heavy machinery when soils are wet to prevent rutting and compaction.		✓				✓		
1e	Pesticide/herbicide application plans will be refined, and the number of provincially certified applicator staff will be increased.			✓					
2	Explore options for vegetation use (Groundside) (e.g., replanting, chipping, mulching, or use as fire wood).		✓				✓	✓	
2a	Revegetation (seeding) will take place immediately following construction to take advantage of better moisture conditions for enhanced emergence and survival of plants.		✓				✓		
2b	Mulching will be deployed in locations when and where difficulties in establishing vegetation cover are anticipated.		✓				✓		
2c	Seeding using appropriate seed mixes will be employed, where necessary.		✓				✓		

	Sustainability, Mitigation, or Mitigation-by-Design Measure	Design	Construction	EMS	EWM Plan	SWM Plan	ECO Plan	BMP (Already Being Implemented/Will be Implemented)	Under Consideration Pending Further Evaluation
2d	A range of plant materials will be considered based on the physical and chemical characteristics of the target site, thereby increasing the development of species diversity and physical complexity.		✓				✓		
2e	Disturbed areas not required for operations activities may be considered for revegetation using native seed mixes.		✓				✓		
2f	Revegetation seed will be from a locally collected and propagated genetic source of native plant material ensuring that each seed lot is free of restricted and noxious weeds and other species of concern.		✓				✓		
2g	Revegetation success will be monitored following reclamation to ensure the recovery process is progressing toward eventual restoration.		✓				✓		
2h	Reliance on natural recovery may not achieve satisfactory results. Monitoring will identify any need for supplementary actions to improve vegetation recovery rates.		✓				✓		
2i	The appropriate selection of native species will maximize survivability, pest hardiness, and soil salinity tolerance, where required.			✓			✓		
2j	An effective weed control program will be developed.			✓			✓		
2k	Revegetation seed lots used to achieve interim and end use reclamation objectives will be free of restricted and noxious weeds and other species of concern. A Seed Analysis Certificate is available from all seed suppliers which will indicate any weed species or other species of concern in the seed mixture.			✓			✓		
2l	Continued monitoring of problem vegetation to identify areas requiring further reclamation, weed control, and erosion protection measures will be implemented where needed.			✓			✓		
	Vegetation Follow Up and Monitoring								
3	An environmental inspector will be engaged to ensure that activities follow the methods outlined in the ECO Plan (Volume V, Item 14).						✓		
	Dust Management						□		
1	Water down loose materials and exposed earth during construction.		✓				✓	✓	
2	Spray down truck wheel wells and use rumble strips before exiting the construction site where applicable (e.g., areas with topsoil).		✓				✓	✓	
3	Perform regular street sweeping during construction.		✓				✓	✓	
4	Install temporary fencing during construction.		✓				✓	✓	
5	During construction activities: require dust palliatives or penetration asphalt on haul roads.		✓				✓	✓	
6	During construction activities: require hydroseed or fast growing vegetation on disturbed areas.		✓				✓	✓	

	Sustainability, Mitigation, or Mitigation-by-Design Measure	Design	Construction	EMS	EWM Plan	SWM Plan	ECO Plan	BMP (Already Being Implemented/Will be Implemented)	Under Consideration Pending Further Evaluation
7	Develop a balanced earthwork management plan and keep as much excavated earth on-site as possible to reduce off-site hauling.	✓	✓		✓		✓	✓	
8	Use mixed soils for enhanced water retention in landscape areas as fill.		✓		✓		✓	✓	
9	To prevent erosion, minimize the extent and duration of bare ground surface exposure.		✓		✓		✓	✓	
10	When using vegetation to stabilize soils, make sure a layer of topsoil and compost is present to support growth.		✓		✓		✓	✓	
	Stormwater Management								
1	Develop and implement stormwater pollution prevention measures.	✓	✓			✓	✓	✓	
1a	Inspect the site frequently during construction to ensure effectiveness of stormwater pollution prevention measures.		✓	✓		✓	✓	✓	
1b	Owner's rep should monitor water quality impacts by conducting sampling before and during construction, especially after significant storm events.		✓	✓		✓	✓	✓	
1c	On-site personnel should be trained in pollution prevention procedures and always make the ECO Plan available at the construction site for review.		✓	✓		✓	✓	✓	
1d	The Authority's surface water quality monitoring program will continue and will be expanded to take in discharges into the YYC stormwater system from the operations associated with the PRP.			✓					
2	Use stormwater Best Management Practices (BMPs) such as water quality bioswales, landscaping and plant materials to control stormwater runoff rates to accommodate flow from a 100-year flood event.	✓				✓			✓
2a	Install bioswales along roadways and parking areas where able to do so in accordance with TP 312 Transport Canada requirements to encourage groundwater infiltration of stormwater runoff. These strategies must be designed so that they do not provide habitat for hazardous wildlife.	✓				✓			✓
3	Design SWM system to meet standards of Nose Creek Watershed Management Plan (2004).	✓				✓			✓
4	Design surface storm sewer conveyance systems where appropriate to filter and promote better water quality.	✓				✓		✓	
4a	During construction, runoff waters will be collected and excavation waters directed to the storm retention ponds that were developed in anticipation of the development of the PRP.	✓				✓			
4b	All discharged water from dewatering activities and resulting from storm runoff during the construction phase will be directed to retention ponds (Ponds J and K).		✓			✓	✓		
5	Consider other sources (e.g., SWM ponds) rather than potable water for construction purposes.		✓			✓	✓		✓

	Sustainability, Mitigation, or Mitigation-by-Design Measure	Design	Construction	EMS	EWM Plan	SWM Plan	ECO Plan	BMP (Already Being Implemented/Will be Implemented)	Under Consideration Pending Further Evaluation
5	Develop stormwater collection and rain harvesting systems for water reuse.	✓		✓					
5a	Collect and reuse stormwater for non-potable uses such as water infiltration, landscape irrigation (groundside), mixing concrete (if quality is good), dust mitigation during construction, and moisture conditioning.	✓	✓	✓		✓	✓		
5b	Coordinate with local or City governments to determine if other neighbouring properties (e.g., parks or natural spaces) could be used for regional stormwater reuse solutions. If there is adequate viability, YYC could consider the installation of a secondary “reclaimed water” piping network to supply stormwater to those users that can make use of the water in a non-potable way. Stormwater retained in the retention pond systems will be diverted to the Silverwing golf course for their irrigation use.	✓	✓	✓		✓	✓		✓
6	Use storm-septors and Vortechnics for treating stormwater runoff. Separators may be used for pre- or supplementary wastewater treatment where applicable. Contractor to provide water balance and management plan for construction period.	✓				✓	✓		✓
7	Use water quality inlets (WQIs) to separate pollutants from the first flush of stormwater (referred to as oil/grit separators or oil/water separators).	✓				✓		✓	
8	The Authority will implement airplane and pavement de-icing management measures.			✓		✓			
9a	The airport BMPs will continue to be followed, and potassium acetate and sodium formate will be used as the runway de-icing chemicals, as opposed to urea-based compounds, to further protect surface water runoff from nutrient enrichment.			✓		✓			
9b	Centralizing glycol operations as outlined will mitigate the potential for wastes from this product entering the storm management system and being discharged from YYC.			✓		✓			
	Water Conservation								
1	Install low flow/dual flush, variable flush and sensored faucets in AMC.	✓							✓
2	Use rain water harvesting for flushing of toilets and/or urinals in AMC.	✓							✓
3	Moisture conditioning of soils should be conducted using an agricultural disk plough, or other similar tilling equipment to achieve optimum uniform moisture content. This procedure results in reduced compactive effort to achieve specified soil density and makes efficient use of water during grading operations.		✓		✓		✓	✓	
4	Minimize wastewater generation and the treatment of wastewater to a standard that can be used for other opportunities within YYC.		✓	✓			✓		

	Sustainability, Mitigation, or Mitigation-by-Design Measure	Design	Construction	EMS	EWM Plan	SWM Plan	ECO Plan	BMP (Already Being Implemented/Will be Implemented)	Under Consideration Pending Further Evaluation
4a	Assess the potential to collect and treat and/or properly dispose of (or recycle, if possible) water used for vehicles and other activities conducted outside that generate process wastewater or wastewater.	✓							✓
5	Look for opportunities to reuse water off-site if the potential is identified and use is beneficial		✓	✓					
	Surface Water and Aquatic Resources Follow Up and Monitoring								
1	The Authority's existing water monitoring program will be assessed and updated to incorporate the PRP. The existing program samples water quality at several ponds and the discharge points directly into Nose Creek and indirectly through the City of Calgary stormwater system.								
2	Mitigation undertaken to restore wetland function will be monitored. The details of the monitoring program will be determined when the mitigative measures are designed.								
	Lighting and Light Pollution Reduction								
1	Consider a series of controlled lighting strategies in Airside Maintenance Centre (AMC) and/or Field Electric Centre (FEC) (e.g., install motion sensored lighting).	✓						✓	
2	Where acceptable, use High Pressure Sodium (HPS) lamps instead of Metal Halide (MH) lamps; HPS lamps produce more lumens per watt, have less mercury content per lamp, and have a greater average rated life expectancy than MH lamps.	✓						✓	
2a	Use high frequency electronic ballasts (self-dimming) with fluorescent 2, 4, and 8-foot tubular lamps that do not contain mercury.	✓						✓	
2b	For runways and taxiways (as applicable), use LED lighting and signals.	✓							✓
3	Establish Airside lighting controls and procedures to turn off or reduce the intensity of airside lighting (runway, taxiway and apron lights and navigational aids) when not being used.	✓						✓	
3a	Utilize full cut-off luminaries, low-reflectance, non-specular surfaces and low-angle spotlights for roadway and building lighting.	✓						✓	
3b	Focus light toward the earth to minimize night-sky pollution.	✓						✓	
4	Specify strict site lighting criteria and update periodically in conjunction with seasonal daylight fluctuations.	✓						✓	
4a	Establish a schedule for when construction lighting is required and develop a policy to reduce lighting. Use of more portable lighting. Use of portable LED lighting.		✓				✓	✓	
	Buildings								
1	Design using radiant floor heating and cooling to optimize thermal comfort and improve energy efficiency.	✓						✓	

	Sustainability, Mitigation, or Mitigation-by-Design Measure	Design	Construction	EMS	EWM Plan	SWM Plan	ECO Plan	BMP (Already Being Implemented/Will be Implemented)	Under Consideration Pending Further Evaluation
2	Optimize the use of natural lighting.	✓						✓	
3	Consider renewable/alternative energy sources for the FEC and/or AMC (e.g., solar panels, geothermal, etc.). For example, make building photovoltaic ready for the future when the cost of these systems has an acceptable life cycle payback.	✓							✓
4	Use low velocity displacement ventilation to ventilate the building.	✓						✓	
5	Design using a high performance building envelope to optimize building performance.	✓						✓	
	Noise Pollution Reduction								
1	Develop greenbelts along the airport perimeter as an attractive light and noise buffer between the airport and the community.	✓							✓
	Noise Follow Up and Monitoring								
1	YYC has a very extensive noise monitoring network that has been operating for many years. The network will be redesigned to reflect the addition of the parallel runway to the airfield.								
	Fuel Reduction								
1	Require subcontractors and suppliers to submit emissions reduction plans.		✓				✓		✓
1a	Construction vehicles should have standard noise and emissions control equipment. Consider requiring construction vehicles to meet specific emissions standards.		✓				✓	✓	
1b	Track concrete and asphalt plant emissions (if on YYC property) for National Pollutant Release Inventory (NPRI) reporting requirements.		✓	✓			✓		
2	Minimize haul roads to borrow areas, stockpiles, cut/fill distances (balanced Earthworks Management Plan).		✓		✓		✓	✓	
3	Identify and specify materials and material suppliers in order to reduce energy and cost related to their transportation.		✓				✓	✓	
	Paving								
1	Use of warm mix pavement versus hot mix. Temperature difference will result in carbon dioxide reductions, fuel and energy savings, and allow for the use of more recycled asphalt.	✓							✓
2	Reduce the total Portland cement in the content (where design requirements allow) for all pavements, sidewalks, and curbs and gutters. Specify the use of blended (ASTM C595) and/or Performance Specified (ASTM C1157) cements for all Portland cement concrete pavements, sidewalks, and curbs and gutters.	✓							✓
3	As part of an ongoing construction project, remove/recycle existing pavement from Barlow Trail that is not required or needed for future use.		✓				✓		✓
4	Use recycled materials in cement or asphalt bound pavement materials.	✓						✓	

	Sustainability, Mitigation, or Mitigation-by-Design Measure	Design	Construction	EMS	EWM Plan	SWM Plan	ECO Plan	BMP (Already Being Implemented/Will be Implemented)	Under Consideration Pending Further Evaluation
5	Design roadways to meet long life pavement design criteria.	✓							✓
6	Use of concrete for runway/taxiway surface pavement (versus asphalt). Significant reduction in pavement structure required. Additional metre of gravel required and hauling significantly increased (truck traffic to/from the site). Thus, less fuel consumption and disruption to transportation network.	✓							
6a	Use of concrete (versus asphalt). More efficient from an airfield lighting infrastructure perspective (i.e., heating and settlement).	✓						✓	
	Waste Minimization								
1	Require subcontractors and suppliers to submit waste minimization plans.		✓				✓	✓	
1a	Advertise salvage activities prior to demolition activities to encourage salvaged materials reuse. Use a public information website or other means to list salvaged materials to offer for sale or donation. Coordinate with other airport projects that may use the project's construction and demolition waste as a resource.		✓				✓	✓	
1b	Reuse project waste as a resource to another project. This may include concrete, asphalt, granular material, traffic and overhead signs, park benches/landscaping rocks, street lighting, billboards, fencing, transmission lines and poles, drainage structures, land and clearing debris, small ancillary buildings or structures, and building components.		✓				✓	✓	
1c	Utilize excess concrete for Jersey Barriers.		✓				✓		✓
1d	Salvage entire buildings instead of demolishing.		✓				✓	✓	
1e	Track and evaluate the following waste for recycling (at a minimum): land-clearing debris, cardboard, metal, brick, concrete, asphalt, plastic, clean wood, glass, gypsum wallboard, carpet, and insulation.		✓				✓		✓
2	Order materials in bulk or larger containers to reduce packaging.	✓						✓	
3	Donate healthy plants and trees removed during construction to the community.		✓				✓		✓
3a	Require that all vegetation that has to be removed because of construction be chipped for mulching and composting or used for process fuel (if the full plant or tree cannot be relocated, sold, or donated intact).		✓				✓	✓	
4	Recycle lamps and provide recycling information for all luminaries.			✓				✓	
5	Use portable concrete/asphalt crushers or operate concrete crushing/recycling plants on-site to crush chunks of concrete or asphalt into small pieces. This crushed material may then be recycled for use in other construction applications.		✓				✓	✓	
6	Develop a detailed lay-down/sequencing plan. Designate a specific site area for recycling construction waste. Provide on-site locations for storing as much excavated rock, soil, and vegetation as possible for reuse.	✓						✓	

	Sustainability, Mitigation, or Mitigation-by-Design Measure	Design	Construction	EMS	EWM Plan	SWM Plan	ECO Plan	BMP (Already Being Implemented/Will be Implemented)	Under Consideration Pending Further Evaluation
	Socio-economic								
1	Delineate the site perimeter for safety and security reasons and to prevent disturbance beyond the construction area.	✓	✓				✓	✓	
2	Continue to share information with RSA land use planners, economic development officials, City of Calgary fire and police service providers with respect to timing and magnitude of on-site labour force and traffic management plans.		✓						
3	Ensure the provision of on-site security, emergency health care and fire services during the construction phase.	✓	✓						
4	Continue the 2010 Community Outreach Program to keep communities / community associations and other stakeholders potentially affected by PRP informed regarding status of the PRP.		✓						
5	Provide safe bicycle lanes and paths for access to and from YYC. Work with the Calgary Pathways and Bikeways Advisory Council. Recognize contribution of past participants in bike path design (e.g., Devonian Foundation, Calgary Real Estate Board, etc.).	✓							
6	Create aircraft viewing areas and/or construction equipment viewing areas. Perhaps by remote camera.	✓							
7	Donate healthy plants and trees removed during construction to the community.		✓				✓		✓
8	Develop and implement a traffic management plan, including the designation of off-site haul routes, site entrances, signage, truck washing, and policing / enforcement measures.		✓						
	Socio-economic Follow Up and Monitoring								
9a	Undertake Public Attitude Research to verify EA predictions regarding changes in public attitudes and behaviours during the construction phase and during the operations phase. Focus of the research should be on the LSA and those communities where the greatest effects on use and enjoyment of property, community and recreational facilities and community character were anticipated.								
9b	Conduct a field survey of key stakeholders (e.g., airport visitors, taxi / limousine operators, hotel / motel operators) to verify the predictions regarding reduced attractiveness of airport hotels and motels due to the Closure of Barlow Trail.								
9c	Undertake a detailed economic analysis of YYC following the completion of the PRP and IFP to verify the beneficial effects of these projects on Human and Economic Assets.								

	Sustainability, Mitigation, or Mitigation-by-Design Measure	Design	Construction	EMS	EWM Plan	SWM Plan	ECO Plan	BMP (Already Being Implemented/Will be Implemented)	Under Consideration Pending Further Evaluation
	Miscellaneous								
1	Explore avian radar systems to improve aviation safety, security surveillance, environmental management, weather detection, and wind measurement.			✓					✓
2	Prepare project-specific Health and Safety Plan.		✓				✓	✓	
3	Limit number of concrete washout areas.	✓						✓	
4	Plan for deconstruction and flexible use of space.	✓						✓	
5	Locate haul roads so that they can be reused as service roads where possible.	✓						✓	
6	Proper duct-bank system to reduce future excavation and cabling and use of resources.	✓						✓	
7	Develop and implement PRP-specific Emergency Response measures as part of the ECO Plan.		✓				✓	✓	
8	Trucking offers several opportunities for sustainability measures (e.g., scheduling to reduce idling time. Pre-purchasing opportunities, material and stockpiling vs. direct delivery to construction site to eliminate double handling).	✓	✓		✓		✓	✓	
9	All construction equipment and vehicles used on this project will be pre-cleaned using steam or other BMPs prior to deployment on-site.		✓				✓		
9a	All heavy equipment will be inspected for fuel leaks, hydraulic leaks, and other sources of potential soil contaminants. Where possible, biodegradable hydraulic fluids will be used.		✓				✓		
9b	Construction waste and debris will be continuously collected and recycled or disposed of to appropriately regulated facilities.		✓				✓		
9c	A hazardous material and spill response plan will be prepared, and the proper equipment and trained employees will be available during all phases of construction.		✓				✓		
9d	A spill containment kit will be on-site prior to commencement of all phases of construction.		✓				✓		
9e	Any additional maintenance work (e.g., equipment repairs) will follow the same level of environmental protection and mitigation as outlined above.		✓				✓		
9f	All gasoline-powered equipment, such as pumps, generators, and associated fuel, will be stored entirely within a secondary containment structure area located at least 100 m from a wetland. Containment will have 110% capacity relative to the volume of fuel being stored and will be large enough to completely contain all harmful materials should a spill, leak, or overflow occur. Trucks carrying large fuel containers (tidy tanks) will be parked within the containment area.		✓				✓		

	Sustainability, Mitigation, or Mitigation-by-Design Measure	Design	Construction	EMS	EWM Plan	SWM Plan	ECO Plan	BMP (Already Being Implemented/Will be Implemented)	Under Consideration Pending Further Evaluation
9g	Prior to entering within 100 m of a wetland, all equipment and machinery scheduled to work in and/or along the wetland will be inspected and found to be clean, free of leaks, and in good working condition.		✓				✓		
9h	Any cleaning and/or servicing of equipment and machinery at the work site will not be conducted in or along wetlands. Rather, all such works will occur at least 100 m from the wetland, with any runoff controlled to ensure wash materials and/or other substances do not enter the riparian zone or the wetland.		✓				✓		
	Transportation								
1	The City of Calgary's road infrastructure upgrade projects include the completion of 36 Street and Métis Trail, as well as the widening of Country Hills Boulevard.							✓	
1a	Airport Trail and Airport Road will be 3 lanes in each direction to compensate for the closure of Barlow Trail south of Airport Trail.							✓	
2	Transport and airport officials are determining an alternate route to allow the Route 57 bus to access the airport terminal. Rerouting options include using 36 Street, looping from a northeast LRT station round to Deerfoot Trail, or heading north to Country Hills Boulevard.							✓	✓
2a	Calgary Transit has plans for a rapid bus service linking to Airport Trail.							✓	✓
3	Calgary Transit has plans for a train and/or LRT to the airport in the long term.								✓
3a	Calgary Regional Partnership has goals to provide an integrated regional Bus Rapid Transit (BRT) service that would run between key destinations within the City of Calgary and adjacent regional communities connected through a network of Transit Mobility Hubs.								✓
4	McCall Way is currently being redesigned to determine whether the cycleway/pathway along Barlow Trail will still reach businesses south of the terminal.							✓	✓
4a	Plans to modify and improve the pathway network are under development by the Calgary Airport Authority with input and consultation from the Calgary Pathways & Bikeways Advisory Council (CPAC).							✓	✓
	Transportation Follow Up and Monitoring								
5	The City is already acting to mitigate the effects of the PRP on the transportation network including upgrades to 36 Street and Métis Trail, as well as widening of Country Hills Boulevard. The City monitors traffic volumes; as roads reach capacity, it acts to relieve congestion.								

	Sustainability, Mitigation, or Mitigation-by-Design Measure	Design	Construction	EMS	EWM Plan	SWM Plan	ECO Plan	BMP (Already Being Implemented/Will be Implemented)	Under Consideration Pending Further Evaluation
	Climate & GHG								
1	Minimize heavy diesel vehicle idling and turn off equipment when not in use.			✓			✓	✓	
1a	Implement best practices to ensure vehicles and construction equipment are properly tuned and maintained.			✓			✓	✓	
2	Minimize GSE and APU idling and turn off equipment when not in use.							✓	
2a	Implement best practices to ensure GSEs are properly tuned and maintained.							✓	
3	On-site speed limits.			✓			✓	✓	
3a	Careful selection of trucking routes and vehicle movements to minimize travel distances.			✓			✓	✓	
3b	Efforts to minimize land disturbance and land clearing with revegetation at the earliest opportunity.			✓			✓	✓	
4	Reduced aircraft engine taxiing during taxi and idle.							✓	
4a	Derate aircraft takeoff power.							✓	
4b	Reduce use of aircraft reverse thrust.							✓	
4c	Measures to reduce time awaiting landing, such as holding at airport of origin and scheduled peak spreading.							✓	
	Climate & GHG Follow Up and Monitoring								
5	The continued maintenance of an annual inventory of GHG emissions for both internal management and potential external reporting needs is recommended as an action for follow-up.			✓					
	Air Quality								
1	Minimize heavy diesel vehicle idling and turn off equipment when not in use.		✓				✓	✓	
1a	Implement best practices to ensure vehicles and construction equipment are properly tuned and maintained.		✓				✓	✓	
1b	On-site speed limits.		✓				✓	✓	
1c	Careful selection of trucking routes and vehicle movements to minimize travel distances.		✓				✓	✓	
2	Installation of temporary fencing during construction.		✓				✓	✓	
2a	Implement regular street sweeping during construction.		✓				✓	✓	
2b	Application of water to loose materials and exposed earth during construction.		✓				✓	✓	
2c	Prevention of erosion to minimise the extent and duration of bare ground surface exposure.		✓				✓	✓	
2d	Development of a balanced earthwork management plan and keeping as much excavated earth on-site as possible to reduce off-site hauling		✓				✓	✓	

	Sustainability, Mitigation, or Mitigation-by-Design Measure	Design	Construction	EMS	EWM Plan	SWM Plan	ECO Plan	BMP (Already Being Implemented/Will be Implemented)	Under Consideration Pending Further Evaluation
2e	Efforts to minimize land disturbance and land clearing with revegetation at the earliest opportunity.		✓				✓	✓	
3	Minimize GSE and APU idling and turn off equipment when not in use.							✓	
3a	Use electric driven APUs.							✓	
3b	Implement best practices to ensure GSEs are properly tuned and maintained.							✓	
3c	Reduced aircraft engine taxiing during taxi and idle.							✓	
3d	Derate aircraft takeoff power.							✓	
3e	Reduce use of aircraft reverse thrust.							✓	
	Air Quality Follow Up and Monitoring								
4	The maintenance of an air emissions inventory for both internal management and potential external reporting needs is recommended as an action for follow-up.			✓					
	Noise								
1	Adaptation and continuation of existing noise abatement measures (i.e., limitations imposed on pilots related to engine settings at specified locations or altitudes).			✓					
2	One operational scenario was considered in the PRP noise effects assessment. Other scenarios will be considered during the detailed design of the parallel runway. NAV Canada is ultimately responsible for the final airspace design. However, the Airport Authority will recommend, for example, changes to the runway utilization mix which will affect the distribution of noise in communities near the airport.	✓		✓					
	Noise Follow Up and Monitoring								
1	Revised noise monitoring and reporting system			✓					
2	New noise monitoring locations			✓					
	Wildlife								
1	Prior to the commencement of activities, a suitably qualified biologist will survey the site flagging any “At Risk” species, migratory bird nests, or critical habitat.		✓				✓		
2	The site will be prepared prior to the breeding season of “At Risk” species.		✓				✓		

	Sustainability, Mitigation, or Mitigation-by-Design Measure	Design	Construction	EMS	EWM Plan	SWM Plan	ECO Plan	BMP (Already Being Implemented/Will be Implemented)	Under Consideration Pending Further Evaluation
3	If resident SARA species are observed within peripheral habitat outside the LSA setbacks in line with these guidelines will be provided to the greatest extent possible; however, such actions must not compromise the Authority's duty to provide safe operations of the airport. In the case that setbacks cannot be provided, the Authority's wildlife officer will work in cooperation with the relevant regulatory authority to identify alternate mitigative actions which may include removal and relocation of the nest and/or animal.		✓				✓		
4	Should a den or nest for an animal be found to be occupied, then the Authority's wildlife officer will be notified and the appropriate actions in cooperation with the relevant regulatory authority be taken to remove or relocate the animal.		✓				✓		
5	Short-eared Owls and their nests are listed under the *Species at Risk Act* and should not be destroyed.		✓				✓		
6	Vegetation will be cleared outside of the breeding period of Short-eared Owls so that potential nesting habitat within the development footprint will be disturbed.		✓				✓		
7	The operation of the runway will be conducted in line with the Authority's Wetland Strategy for Reducing the Risk of Bird Strikes.			✓					
8	Prior to the commencement of activities, a suitably qualified biologist will survey the site flagging any nests for migratory bird species.		✓				✓		
9	Initial ground disturbance (top soil removal/stripping) will occur outside the breeding bird season (April 15 to July 31).		✓				✓		
10	Several semi native vegetation assemblages exist across the site including a number of small aspen stands. The following recommendations should reduce an adverse effect during vegetation clearance: (1) cut trees outside of the breeding bird season (April 15 to July 31); and (2) incorporate species within landscaped areas or other conservation initiatives that the Authority contributes to offset the loss of trees.		✓				✓		
11	The operation of the PRP will follow the guidelines set out in the Authority's Wildlife Control Plan.		✓				✓		
12	Wherever possible, wildlife disturbed during works will be relocated to areas outside of the PRP footprint in cooperation with the Authority's wildlife officer and the appropriate regulatory authority.		✓				✓		
13	Effects on wildlife will be reduced by controlling or eliminating unnecessary access to off-site areas and the conservation of sensitive habitats.		✓				✓		

	Sustainability, Mitigation, or Mitigation-by-Design Measure	Design	Construction	EMS	EWM Plan	SWM Plan	ECO Plan	BMP (Already Being Implemented/Will be Implemented)	Under Consideration Pending Further Evaluation
14	Sensitive habitats in peripheral areas of the LSA or within the RSA will be off-limits to ground disturbing construction activities to the extent possible. Staff and contractors will be trained on the importance of protecting this sensitive habitat and access to any peripheral retained areas will be prohibited.		✓				✓		
15	The wildlife management plan includes habitat management, resource management and reactive strategies to keep wildlife from the airfield. The continuation of the wildlife management plan is an effective mitigative technique to decrease wildlife strikes.			✓					
16	Ongoing landscaping and conservation initiatives by the Authority will incorporate vegetation species that provide for the future habitat for “At Risk” species or migratory birds off-site where restoration or wetland replacement is to occur.		✓				✓		
	Wildlife Monitoring and Follow Up								
17a	Monitoring will typically be a program designed to: confirm the effectiveness of the mitigation techniques and determine whether increased or different approved mitigation techniques are required to achieve mitigation or reclamation goals						✓		
17b	The Authority’s existing practices for monitoring fauna will be continued. Monitoring will ensure encounters with Species at Risk are dealt with in accordance to the ECO Plan and mitigation outlined in the CS.						✓		
	Land Use Monitoring and Follow Up								
	There are no residual effects on land use within the LSA or RSA and as such no follow-up or monitoring will be required.								
	Cultural Resources Monitoring and Follow Up								
	All environmental inspectors will be on-site during construction. Any cultural resources discovered during construction at sites other than those described by FMA (Volume V, Item 11) will be repaired and any mitigative measures required by Alberta Culture and Community Spirit will be implemented. Any Human remains encountered will be reported to the Calgary Police Service.								
	Human Health Monitoring and Follow Up								
	Routinely evaluate trends in herbicide/pesticide and other chemical use with an aim to the facilitation of ongoing reductions in use.								
	Develop a monitoring program to detect relevant pesticide/herbicide or other chemical residues in surface runoff from treated areas, and provide feedback to application practices and rates.								

	Sustainability, Mitigation, or Mitigation-by-Design Measure	Design	Construction	EMS	EWM Plan	SWM Plan	ECO Plan	BMP (Already Being Implemented/Will be Implemented)	Under Consideration Pending Further Evaluation
	Establish performance objectives adequate to prevent future impacts to aquatic ecological receptors.								
	Contaminated Sites and Waste Management Monitoring and Follow Up								
	The on-site environmental inspector will oversee demolition and will report any signs of chemical contamination so that appropriate remedial action can be taken.								