Thunderbird is a supernatural animal of incredible spirit, authority, intelligence, and transformation.

His keen eyes flash with lightning and his beating wings are thunder incarnate!
Thunderbird

“The story of the Thunderbird in Native American Mythology is popular among various Native American and First Nations peoples. Thunderbird is a giant supernatural bird who causes thunder and lightning. His weapons are lightning snakes which are carried beneath his wings. Lightning flashes when he throws the lightning snakes or when he blinks his eyes. He is powerful enough to hunt Killer Whale and is often depicted with one in his talons, he is also known to help the weak and poor by in some cases picking up large animals (killer whale) and dropping them in a village of need. In many Coast Salish legends, Thunderbird is a mountain dweller and is a highly intelligent creature. From his home, he keeps a close eye over his dominion. Humans should beware not to try and outwit Thunderbird for they are most certain to have it backfire. In some Coast Salish myths, the peak Black Tusk in southern British Columbia, Canada is said to be his favorite perch. According to the Qwileute people of Washington State, it is the Blue Glacier of Mount Olympus. Art designs vary by artist but some common features found in Northwest Coast are a hooked beak, often but not always larger than that of Eagle. Thunderbird is often shown with a crown or a curvy top, showing supernatural powers. The Thunderbird represents the carrying out of law and protocol.” (Squamish Lil’Wat Cultural Centre, 2011, The Thunderbird)

The Olympic Games

“Modern Olympism was conceived by Pierre de Coubertin, on whose initiative the International Athletic Congress of Paris was held in June 1894. The International Olympic Committee (IOC) constituted itself on 23 June 1894. The first Olympic Games (Games of the Olympiad) of modern times were celebrated in Athens, Greece, in 1896. In 1914, the Olympic flag presented by Pierre de Coubertin at the Paris Congress was adopted. It includes the five interlaced rings, which represent the union of the five continents and the meeting of athletes from throughout the world at the Olympic Games. The first Olympic Winter Games were celebrated in Chamonix, France, in 1924.” (International Olympic Committee, 2011, Olympic Charter, p. 9)
Thunderbird Centre
A Design Thesis Submitted to the Department of Architecture and Landscape Architecture of North Dakota State University

By Dustin Froese
In partial fulfillment of the Requirements for the Degree of Master of Architecture

Primary Thesis Advisor

Thesis Committee Chair

May 2013
Fargo, North Dakota, USA
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ABSTRACT
In the wake of the 2010 Winter Olympic Games in Vancouver, specialized sporting facilities such as the Whistler Sliding Center have become unused mementos that are expensive to maintain and are a burden to the local community. Transforming the Whistler Sliding Center into Thunderbird Centre is a step towards establishing a sustainable Olympic legacy that can become a model for the specialized sporting facilities of future Olympic Games. Thunderbird Centre is a resort development that has been master planned to preserve the spirit of the original sliding center. Master Plan elements include intimate mountain lodging, adventure tourism activities in the backcountry, expansive public parks and many more amenities. The sliding track itself will host an ornamentally planted bioswale that naturally treats the Centre’s water runoff, effectively integrating the foreign concrete track into the local ecosystem. Thunderbird Centre’s flagship is a public health facility located in the final curve of the track, which has been named “Thunderbird”. The fitness facility (which is the focal point of this thesis project) embodies the Olympic ideals of sport, it is influenced by the surrounding natural environment and it addresses the needs of the community in order to create a valuable community asset from an obsolete sporting facility.

keywords: 2010, architecture, bobsled, Canada, fitness, Olympics, re-use, sustainability, thesis, Thunderbird, tourism, Whistler

PROBLEM STATEMENT
How can architecture transform obsolete Olympic facilities into valuable community assets?
Statement Of Intent

Figure 1 - Photo of the gondola view of the Whistler Sliding Centre
Statement of Intent

Theoretical Premises

1. Some Olympic sporting facilities become obsolete after their Olympic Games come to a close.
2. Obsolete sporting facilities can be harmful to the environment and the local economy.
3. Simply removing an obsolete sporting facility is not enough to lift its financial and environmental burden of the past present and future.
4. Architecture can be a valuable community asset when it meets the needs of the surrounding community.

Conclusion:

Sometimes, a piece of architecture can be a burden to a community’s social, financial, cultural and physical environment. In contrast, it can also be a source of significant benefits for these same environments. Thunderbird Centre hopes to replace financially burdensome post-Olympic structures (the Sliding Centre) with a beneficial one (a resort development), which doubly improves the state of the local community. By re-purposing obsolete Olympic facilities into new amenities and opportunities, in the tourist based economy of a post-Olympic environment, a proverbial Olympic ‘white elephant’ can be transformed into a sustainable and robust Olympic legacy. The example set by Thunderbird Centre will not only contribute to the Whistler community, it will set a precedent of successful Olympic legacy architecture and master planning for future Olympic Games.

Typology

Thunderbird Centre is a master planned resort development that includes residential cabins on subdivided plots of land, as well as amenities such as a backcountry excursion centre, an arborium event centre, an Olympic legacy museum and reception centre, public parks, walking paths and hiking trails. The focal point of the master plan and this thesis project is an athletic centre that facilitates strength training, swimming, group exercise classes, meditation, and personal training.

Claim

Architecture can transform obsolete Olympic facilities into valuable community assets.

Actors: Architecture
Action: Transformation
Object acted upon: Obsolete Olympic Facilities
Manner of Action: Positive transformation within a post-Olympic environment.

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Project Justification

The Olympic Games are a global sporting sensation that entertain millions of people worldwide and highlight the economic power and potential of the hosting nation's economy. Unfortunately, this Olympic effect achieves its national benefits by sacrificing the well-being of the hosting cities and resorts. According to Nancy Wilhelm-Morden, the current mayor of the 2010 Winter Olympic Games Host Resort, the Resort Municipality of Whistler:

"There were quite a number of negatives arising from the Olympics as well. Important decisions were made with little or no local government consultation, increased property taxes in the years preceding and immediately following the Games, what appears to be a white elephant (the Sliding Centre), business outside of the Village suffered in the months preceding the Games and during the Games themselves. The municipal agenda was completely taken over by Games-related matters for months, in fact, years before the Olympics." (N. Wilhelm-Morden, personal communication, September 27, 2012)

Unfortunately, the Olympic fallout is more of a rule than an exception. "Almost every [Olympic] Games of the past three decades has been accompanied by the claim that it would give a boost to investment, infrastructure and tourism, and in almost every case the prospect has been false." (Perryman, 2012, pp. 33

Exploring the possibilities of obsolete Olympic facilities generates a new model of pro-active Olympic sustainability initiatives that can be used as an example for future host cities. Demonstrating the positive transformation of an otherwise useless facility can help preserve the unique features of future host cities that make them such desirable and valuable destinations.

Whistler’s mountain terrain and climate present many unique design challenges that will require smart vernacular structural systems, comprehensive passive and active system design solutions and responsible material choices. Whistler’s symbiotic connection with the natural environment also places strict environmental standards on all structures in the Resort Municipality of Whistler.

The preceding paragraphs speak of negating the ill effects of a burdensome bobsleigh track (the depth of which will be expanded on in the research results section). However, the cessation of a functioning bobsleigh track also leaves an unfilled void in the Whistler community.

Removing the function of ‘sliding centre’ from the site addresses the financial drain, but transforming it into a valuable community asset not only takes it ‘out-of-the-red’, but brings the proverbial community ledger back into a positive state.

Therefore, I propose to address the economic and social needs of the Whistler community by transforming the Whistler Sliding Centre into something new; a process that is both subtractive and additive in nature.

Unifying Idea

The athletic competitions of the Olympic games don’t just promote health, which these days, can seem just akin to surviving. The games promote a robust and thriving lifestyle that encourages everyone, regardless of age, race, ethnicity, ability or sexuality to live life to the fullest and to be the best human being that you can be. Likewise, the approach to transforming the Whistler Sliding Centre will surpass the status quo.

The pursuit of wholistic health, and alpine activities is a driving force in the lives of Whistlerites and was an incredibly attractive community attribute that brought the 2010 Winter Olympics into the mountain village. To a degree, the Olympics altered the Whistler Community’s pursuit of these attributes by introducing the Olympic Games as the primary driving force in the community in the years preceding the games. When the Olympics ended, a vacancy was left in the figurative list of community goals. And, unsustainable and obsolete facilities were left behind. In an effort to prevent further derailment of a communities goals, elements that detract from the pursuit of wholistic health, financial health and environmental health need to be removed and replaced with elements that reinforce a robust and healthy lifestyle in a manner that aligns with the needs of the community and the ideals of the Olympics.

Figure 2 - Photo of Whistler’s extensive Walk/Bike trails
Figure 3 - Photo of the Olympic Plaza at Dusk

PROPOSAL
Narrative

One significant factor that helped convince the International Olympic Committee (IOC) to choose Vancouver and Whistler to host the Olympic Games is the beauty of the natural surroundings. Broadly speaking, Canada is known for being a place of wilderness and natural splendor. The Province of British Columbia itself boasts an incredible range of geographic and biological diversity. Framed by the Pacific Ocean to the West and the grand Rocky Mountains to the East, the lands in between contain a bright mosaic of peoples and places. The pinnacle of natural wonder summits in Whistler, British Columbia, Canada.

The vast mountain- scapes and island-studded ocean can be seen from many vantage points in the Whistler vicinity. The entire area can by described simply - it is a rich place; rich in natural beauty, rich in adventure, rich in history and culture, and rich in memory. It’s no surprise that the provincial motto is ‘Splendor without diminishment’.

British Columbians, myself included, have fond memories of fishing the Fraser river with our Fathers, camping in deep valleys with our families, skiing the mountains with our friends and visiting the Pacific beaches with our schools. Of all the fantastic places on the globe, this is our favorite and we are fiercely proud and protective of it.

The presence of the 2010 Winter Olympics in Whistler BC was an opportunity to show the world the land that we love so much. The 2010 Olympic theme ‘With glowing hearts’ alludes to a phrase in the Canadian National Anthem and it couldn’t have been more appropriate. Our Western jewel stood front and center on the world’s stage and she performed brilliantly. But, with the closing ceremonies, the 2010 Winter Olympics became just a memory in the global consciousness. And, while the world turned its attention to other matters, the inhabitants of Whistler were left to sweep the stage.

Currently, a 705 million dollar bobsled track sits like an abandoned castle at the head of Whistler Village. Since the Olympics, the track, which makes up the bulk of the Whistler Sliding Center has been seldom used and no hope exists for recovering its cost; a cost that has fallen onto the shoulders of the Vancouver Organizing Committee (VANOC) and the inhabitants of the Resort Municipality of Whistler (RMOW). Though many Olympic legacy plans have been implemented, nothing has been done to address the enormous maintenance cost and waste of incredibly valuable land caused by the Whistler Sliding Center.

The Whistler Sliding Center has become a burden because its form no longer serves a financially viable function. Utilizing architectural design to subtract, add and modify the Whistler Sliding Center is its best chance at regaining a new life and a new purpose in the local community. Where demolishing and completely re-designing the entire site would offer the largest range of possibilities, it would also be incredibly cost-prohibitive, environmentally destructive and wasteful.

The process of transformation uses the existing facility to its greatest capacity, then adds and subtracts as a thoughtful and sensitive design dictates. Transforming the Sliding Center also allows major facility elements to remain reminders of the Olympic spirit, even though they may serve a new purpose.

Unfortunately, transformation isn’t free. Investing more money into an over budget Olympic memento may seem like a poor idea to most, but, infinitely paying for the costly symptoms of a derelict facility would probably prove to be even less desirable. Investing in Whistler’s future is a pro-active way to help the community grow stronger, and to help it move beyond its post-Olympic shackles.
Parties involved

Permanent Residents:
The 10,531 permanent residents of Whistler occupy 3,909 private dwellings (Whistler2020, 2011). In a quirky Pique News magazine article, journalist Lisa Powell describes three common stereotypes that can playfully categorize the inhabitants of Whistler.

The first group of Whistlerites are identified as "Lively Locals". These people are young adults who have come to Whistler to experience the freedom and independence of mountain culture. They love the party scene and commonly frequent the bars and clubs that line the Village stroll. This exuberant group make up the major percentage of citizens.

The second group of Whistlerites are identified as "Long Time Locals". The Long Time Local is a citizen who has lived in Whistler for ten or more years. This group has fully established a life in the mountain village and frequently makes use of all the amenities the village has to offer. This group make up the major percentage of citizens.

The third group of Whistlerites are identified as "Newcomers". These people are new residents with the intent to quickly become a "Long Time Local". Though they actively take part in mountain activities, they are primarily interested in investing into the community and establishing a life for themselves.

Powell ends her article with an insightful quote. "An important thing to remember is that everyone in Whistler has something in common. We all love our little village and for whichever reason we have come here its beauty unites us. Whoever you meet, you have that in common with."

Visiting Tourists:
The estimated daily tourist count is on average 14,837 people (Whistler2020, 2011, Whistler Population Equivalent) The annual number of visitors is around 2 million people.

User Description

The intended users of Thunderbird Centre fall into two distinct categories: permanent residents and visiting tourists. Permanent residents include any individual, group or family that identify Whistler as their permanent home. Visiting tourists include anyone who visits Whistler with a home outside the Whistler region.

Developing a business model that ensures financial resilience over the long term (Whistler 2010 Sport Legacies, 2011)

Figure 6 - Whistler 2010 Sport Legacies logo (Whistler 2010 Sport Legacies, 2011)
The transformation of the Whistler Sliding center into Thunderbird Centre Resort will be approached at two different scales: the urban design scale and the individual building scale. The urban design scale will manifest in the form of a diagramatic master plan. The individual building scale will develop one of the buildings identified in the master plan of Thunderbird Centre Resort: the Thunderbird Fitness Centre.

Thunderbird Fitness Centre Building Elements:

**Primary Spaces:**
- Heavy weight exercise area
- Light weight exercise area
- Cardiovascular training
- Short course lap pool
- Rock climbing wall
- Group exercise/dance studio

**Secondary Spaces:**
- Entry Vestibule
- Guest reception and check-in
- Personal training studio
- Training offices
- Administration offices
- Rock climbing desk
- Group exercise/dance studio
- Conference room
- Private gardens
- Work room

**Service Spaces:**
- Locker/shower/toilet rooms
- Laundry room
- Equipment storage
- Facility storage
- Cardiovascular
- Mechanical space
- Accessible parking
- Outdoor secure garbage
- Vending

Thunderbird Centre Resort Master Plan Elements:

**Building Assets:**
- Welcome & reception centre (T)
- Olympic Museum (T)
- Private lots (N)
- Duplex and Quadraplex units (N)
- Arboretum event centre (T)
- Resort Maintenance (T)
- Resident’s hot house (T)
- Public washrooms (T)
- Youth Hostel (N)
- Fitness Centre (N)

**Site Assets:**
- Parks (T)
- Walk/bike trails (T)
- Ornamentally planted bobsled track (T)
- Nodar Kumaritashvili Memorial (N)

Concerning Both Major Users:

The physical capacity of this population encompasses the fully abled to the physically challenged. This facility will embrace ADA guidelines ensuring that people of all abilities can make full use of each and every amenity.

The community at large has no single social, cultural, ethnic or cultural identity that requires special attention. However, two ethnic conditions do need to be addressed. Firstly, the broad range of diversity dictates a design of inclusion. The design should celebrate the diversity of the local population without offending visitors. Secondly, sensitivity to the rich First Nations heritage of the area should be observed. Relying on the representatives from the Lil’wat Nation and the Squaamish Nation on the Whistler 2010 Sport Legacies council for direction in this area would be wise. Any symbols or references to First Nations culture and heritage should be handled with pride and sensitivity.

The Resort Municipality of Whistler

The Resort Municipality of Whistler is the local governing body that presides over the municipal region of Whistler. The RMOW is responsible for 10,531 permanent residents, 2 million annual visitors and 31,209 acres of land. The laws and bylaws are enforced by the Royal Canadian Mounted Police. The RMOW is led by a elected mayor and six councilors who are elected for three year terms. A General Manager of Infrastructure Services directs the Engineering, Roads, Utilities, Wastewater treatment, Transit, Development and Energy systems departments. A General Manager of Resort Experience directs the Planning, Building Services, Environment Stewardship, Parks and Trails Operations and Building Maintenance services departments. (Resort Municipality of Whistler, 2011)

The RMOW is responsible for the physical planning of the municipality. The laws and bylaws are enforced by the Royal Canadian Mounted Police. The RMOW is led by a elected mayor and six councilors who are elected for three year terms. A General Manager of Infrastructure Services directs the Engineering, Roads, Utilities, Wastewater treatment, Transit, Development and Energy systems departments. A General Manager of Resort Experience directs the Planning, Building Services, Environment Stewardship, Parks and Trails Operations and Building Maintenance services departments. (Resort Municipality of Whistler, 2011)

This municipal branch of the Canadian government directly serves the inhabitants of Whistler. Whistler follows the community charter dictated by the Province of British Columbia. The Charter charges council members "to consider the well-being and interests of the municipality and its community" (The Province of British Columbia, 1996)

Because the majority of the funding for the Whistler Sliding Centre comes from the government, political involvement is inevitable. Also, the publicly visible and potentially controversial nature of this project would require a close working relationship with the Mayor and council of the RMOW for it to ‘get off the ground’.
Proposal

Project Elements

Description of Elements

Thunderbird Fitness Centre Building Description:
Thunderbird Centre will be the focal building for this thesis project. It will feature prominently in the final presentation.

Primary Spaces:

A 75’1” long lap pool offers exercise opportunities to people of all capabilities. It conforms to Olympic standards and can be used to host swim meets. The shallower half can host water aerobics. A public whirlpool creates a relaxing social space that can be shared by males and females together.

Rock climbing wall
To serve rock climbing enthusiasts and beginners alike, the rock climbing wall provides a challenging activity that strengthens the body and increases coordination, agility and teamwork. The concrete wall itself acts as a heat sink, passively heating the open exercise areas by releasing warmth captured from sunlight.

Group exercise/dance studio
An open air space with a hardwood dance floor facilitates group exercise classes such as yoga, aerobics, step class, Zumba™ and any other class offered by the fitness staff.

Secondary Spaces:

Entry Vestibule
A buffer zone between the interior and exterior spaces.

Guest reception and check-in
A security measure to ensure that all facility participants have paid their fee and signed the limited liability waiver. This space will also act as the first point of contact for people visiting the facility. Comprehensive information and signage direct visitors from this point to their intended destinations.

Personal training studio
A small exercise space used for one-on-one training, small group training and fitness testing.

Training offices
Office for fitness staff. Equipped for fitness consultations.

Administration offices
Offices for facility administration.

Rock climbing desk
Rock climbing supervision and equipment.

Conference room
A medium sized meeting room that can be used by employees and residents of the resort.

Private gardens
Separate male and female gardens offer outdoor social spaces that cater to relaxation and mental health.

Light weight exercise area
For the less experienced individual. Equipment would include isolated exercise machines, dumbbells and barbells in weights from 1 lb to 50 lbs and circuit training.

Cardiovascular training
This function would be spread throughout the whole facility. Equipment would include treadmills, stationary bikes, stair climbers, ellipticals and ergometers (rowing machines).
Small subdivided pieces of property can be sold to help finance the transformation of the Whistler Sliding Centre. Revenue from the sales would create a significant amount of cash flow at the beginning of the transformation. Any shortfall can be supplemented by the revenue generated by the visiting tourists. Ideally, small environmentally sensitive residences would be built by the new owners. They would become permanent residents of Thunderbird Centre Resort. Their presence establishes a consistent year-round community.

Backcountry Adventure Centre
The Whistler Sliding Centre site is the Southernmost piece of property in the Fitzsimmons Valley, making it the closest buildable area to the Whistler Backcountry. Currently, the backcountry is inaccessible to most people, and is therefore an underutilized asset. Transforming the Men’s starting house into a Backcountry Adventure Centre creates a gateway that will allow more people to be equipped and guided into Whistler’s beautiful unregulated areas. Ziptrek tours, which offers Zipline excursions directly adjacent to the Whistler Sliding Centre site could also operate out of this location.

Duplex and Quadraplex Units
Duplex and Quadraplex cabin units create intimate community spaces for visiting tourists. The Alpine style cabins offer a mountain experience that the mid-rise hotels in Whistler Village cannot. Temporary visitors who stay in the Duplex and Quadraplex units would have full access to all the amenities of Thunderbird Centre Resort.

Arboretum Event Centre
A glass arboretum can be enjoyed daily by the public or rented out for special events. Raised Planters within the arboretum utilise tidal basin wetland systems which treat the greywater and blackwater produced by all the buildings of Thunderbird Centre Resort. Also referred to as living machines, these constructed wetlands ensure that Thunderbird Centre Resort adds no additional burden to the wastewater treatment system of Whistler. Their aesthetic plantings add beautiful greenery to the year-round, tree filled arboretum.

Resident’s Hot House
Private whirlpools, saunas and steam rooms are available to the permanent residents and temporary guests of Thunderbird Centre Resort. This building helps connect all resort users in a single place. In addition to the interior spaces, exterior fire pits and BBQ grills provide opportunities for shared meals and shared stories.

Nodar Kumaritashvili
Nodar Kumaritashvili was a Georgian (Country) luger who lost his life during a training run prior to the Luge competition of the 2010 Winter Olympics. A memorial dedicated to him would create a unique garden feature that is beautiful, yet respectful of the tragedy.
Public Washrooms
Whistler has a significant lack of public washroom facilities. Providing public access to these facilities helps ensure that anyone can comfortably enjoy a full day at the public parks or on the trails.

Youth Hostel
The expensive hotels of Whistler Village have left little to no accommodation available for younger visitors with small incomes. These young adults make up a significant percentage of the population. A Youth Hostel with mountain access and within walking distance of the main Village would be a convenient and affordable place for this group of tourists to stay. It would also be a consistent source of income for the resort.

Site Assets:

Parks
The park areas of Thunderbird Centre Resort effectively extend the existing park system of Whistler.

Walk/bike trails
Paved walking and biking trails connect the pedestrian to Thunderbird Centre Resort. A new path connecting the Resort to the centre of Whistler Village would run approximately 1.7 km (1.1 miles), which would take approximately 30 minutes to walk at a moderate pace, or 7 minutes to cycle.

Children’s accessible playground
A precedence of accessible children’s playgrounds was set with the construction of several ADA approved playgrounds for the 2010 Winter Olympics. This initiative will continue with the construction of another in the parks of Thunderbird Centre Resort.

Ornamentally planted bobsled track
The bobsled/luge/skeleton track will remain intact for the most part. Its large concrete mass will become a serpentine sculptural element that adds to the aesthetics of the parks. Filling the trough with aggregates, buffers, piping and specific plantings will turn the structure into a linear bioswale that filters the water runoff of the many roofs and roads in the resort. The environmentally sensitive initiatives of Thunderbird Centre Resort will act as an example for low-impact alpine living.
Introduction

In the North American country of Canada, in the Western Province of British Columbia into the Coast Mountain Village of Whistler sits the Whistler Sliding Center site.

The Whistler Sliding Center sits on the base of Blackcomb mountain. Its North-West facing topography has elevated views of the Village of Whistler. The property covers 52.61 Acres and has an elevation change of 210 m [690 feet] (Resort Municipality of Whistler, 2011).

A creek and waterfall run down the length of the site. The rocky terrain is populated with mountain grasses, shrubs and mighty coniferous trees. Nearby elements include Whistler Village, Blackcomb Mountain, Whistler Mountain, Fitzsimmons Creek and Fitzsimmons Creek Valley.

The proposed subdivision of the existing property would require permission from the RMOW. New property lines would need to be drawn in addition to new zoning.

The Whistler Sliding center sits on the traditional lands of the Lil’wat and Squamish Nations. The First Nations people make no legal claim to the property but their mythology of the legendary Thunderbird is intrinsically linked to this land. Thunderbird is a highly intelligent spirit of nature that protects its dominion. When Thunderbird flaps his wings, thunder echoes among the mountains and when he blinks his eyes lightning strikes. (Squamish Lil’wat Cultural Centre, 2011)

The Icon of Thunderbird serves as the inspiration for the design of Thunderbird Centre Resort.
Whistler Orientation

Whistler Village sits at the base of Whistler Mountain and Blackcomb Mountain.

The Village can be accessed from Vancouver by driving up the Sea-to-Sky Highway, or, a luxury passenger train commutes twice daily between the two.

Multiple micro-communities have been developed within Whistler. The two most prominent are ‘The Upper Village’ (formerly Blackcomb Village) and Creekside. Chairlifts and gondolas take skiers, snowboarders, mountain bikers, hikers and tourists from Whistler up the mountain. A network of walks/hike paths make the entire area pedestrian friendly. The Whistler Sliding Centre is a three minute drive, an eight minute bike ride, or a 25 minute walk from the main Village.

The Whistler Sliding Centre on the left page has been expanded on the right page.
Project Emphasis
Thunderbird Centre Resort emphasizes the following conditions (in order of importance):

Economic Regenerative Design
(urban design scale)

Designing for Physical and Mental Well-being
(building scale)

Economic Sustainability: At its heart, Thunderbird Centre Resort is an experiment in sustainability; common approaches in sustainability focus on harnessing sunlight and using products with a ‘green’ label. This project is different. While the design will harness sunlight, use environmentally responsible materials and employ other passive practices, its primary emphasis lies in macro re-use and economic sustainability. Instead of focusing on lowering a monthly energy bill, Thunderbird Centre Resort attempts to lift the burden of a financially un-sustainable facility from the shoulders of an entire community by transforming it into a revenue generating development that not only generates income for itself, but for the entire community (in an indirect way). In general, this will be accomplished by attracting tourists from outside of Whistler, providing tourism opportunities for a fee, and allowing that outside money to percolate into the Whistler community. This entire effort is born of the obsolete facilities left behind by the 2010 Winter Olympics. The proposed Thunderbird Centre Resort will be explored and presented in the form of a Master Plan that diagrams the transformation.

Designing for Physical and Mental Well-Being: The decision to include a secondary focus on this project was based on two factors. First: in order to fulfill the requirements for the M.ARCH degree at NDSU, proficiency of all aspects of building design must be demonstrated. Second: developing an athletic facility is directly aligned with the goals of the International Olympic Committee. The high cost of maintaining a bobsled track and its inaccessibility to most of the people who are paying for it make it obsolete. Developing Thunderbird Fitness Centre is effectively replacing an athletic facility that doesn’t work with one that does.

To fully demonstrate a working athletic facility, the design of this building will be taken to completed presentation drawings, diagrams and some details.
Definition of Research Direction: The development of Thunderbird Centre Resort will pursue further knowledge in the areas of its theoretical premises, its typologies, historical context, micro and macro site elements and programmatic requirements. The two distinct scales that this project approaches will be pursued jointly in the interest of a unified design, however deviations into separate interest areas is unavoidable.

Plan of Design Methodology: Both quantitative and qualitative information will be pursued. This information will be gathered for the purpose of:

- Graphic Analysis
- Digital Analysis
- Physical model Analysis
- Conceptual Analysis
- Interview Preparation

Quantitative and qualitative data will be gathered simultaneously following the topics defined by the theoretical premise with priority being given to the topics (in order) as listed in the project emphasis section of this proposal.

Data will be analyzed and applied to the design of Thunderbird Centre Resort and Thunderbird Fitness Centre as their results dictate within the guidance of the theoretical premises.

Collected information will be not only be utilized during appropriate segments of the design process, but the comprehensive body of gathered knowledge will be interpreted and presented through text and graphics in the form of a final presentation board.

Quantitative data includes information of relative values. It includes statistical data, scientific data and all other numerical sets of data. Quantitative data can be gathered through measurements, experimentation or from archived resources published by another reputable source. Qualitative data includes descriptive information that can be simple, complex, tangible and intangible in nature. It can be gathered through direct observation, surveys, personal interviews and from archived resources published by another reputable source.

Plan for Documenting the Design Process: A comprehensive collection of all design process documents will be compiled into a compendium in digital format. This compendium will be preserved both in digital copy and hard copy. Digital copies will be stored in quadruplicate: one copy on a computer hard disk drive, one copy on an external hard disk drive, one copy “burnt” onto a Digital Versatile Disk (DVD) and one copy to be uploaded onto the servers of the Carbonite online backup service (www.carbonite.com). A hard copy will remain in the possession of the author and of the administrating University (NDSU).

The compendium of information, being a comprehensive collection of information cannot be appropriately presented in its entirety. Instead, the most important information will be discerned and presented in the time allotted. Unrepresented data will remain in the compendium to give the presented data credibility and will act as a reference for any and all questions and inquiries.

Once the design process has begun, all documents will be digitally scanned, then chronologically and topically named once a week. This process will allow for efficient searchability and organization.

To the right is a proposed schedule of the design process for the Spring Semester, 2012.
Figure 19 - Photo of Garibaldi Provincial Park, adjacent to Whistler
Introduction:
The Olympic Games are a global sporting sensation that entertain the world, encourage healthy competition, instill national pride and bolster the hosting nation’s economy. Unfortunately this Olympic Effect achieves its national benefits by sacrificing the well being of the hosting cities and resorts.

Olympic fallout is more of a rule than an exception. “Almost every Olympic Games of the past three decades has been accompanied by the claim that it would give a boost to investment, infrastructure and tourism, and in almost every case the prospectus has been false.” (Perryman, 2012)

Andy Holloway concurs in his Canadian Business cover story. “But all too often the real Olympic legacy is a sea of red ink that taxpayers have to pay off, with underused or bankrupt sporting facilities and little if any lasting change to the local economy. ‘There’s no measurable economic growth that happens from an event or from a sports team’ says Jeff Owen, an assistant Professor at Indiana State University, who specializes in sports economics. ‘Either the impact is zero or slightly negative if anything. The economic benefits are a fraction of what economic impact studies project.’” (Holloway 2006)

Exploring the possibilities of obsolete Olympic facilities generates a model of pro-active Olympic sustainability initiatives that can be used as an example for future host cities. Demonstrating the positive transformation of an otherwise useless facility can help preserve the unique features of future host cities that make them such desirable and valuable destinations.

The research that sets the foundation for the design of Thunderbird Centre Resort and Thunderbird Fitness Centre is expanded on in the following section. The following is not an exhaustive reproduction of this research, rather, it highlights the most pertinent points and draws connections and conclusions. This research is presented as a series of answers to questions I asked about each theoretical premise. Analysis is integrated into each answer as a way to discern why this information is important and how it can be used to inform the design.
What is the value of a bobsled track? The Whistler Sliding Centre is an ammonia refrigerated half-tube of ice-covered concrete that athletes slide down in their respective competitions. Bobsled teams can be two or four people. The athletes ride a bobsled, which resembles the body of a small plane without wings. Luge has individuals and doubles categories while skeleton athletes make the slide individually. Luge athletes make the slide first. Skeleton athletes make the slide headfirst.

In pertinent literature, the intangible value of the Whistler Sliding Centre is passionate, but vague. Gary Kingston, a reporter for the Vancouver Sun newspaper, wrote an informative article including an interview with Whistler Sport Legacies’ CEO Keith Bennett. Whistler Sport Legacies is the non-profit company that has managed all Olympic venues in Whistler since the conclusion of the 2010 games. In the article, CEO Bennett says “Our mandate is really about maintaining the legacies of the 2010 Olympic Games, developing sport and providing a venue for international and national competitions. The sliding centre is critical to our success in Sochi (at the 2014 Olympics) and beyond” (Kingston, 2015). In a separate interview with Pique Magazine, Whistler’s local newspaper, Bennett said “We think we really add some diversity in the community” (Taylor, 2013).

Since the close of the 2010 Winter Olympics, the Whistler Sliding Centre has hosted a handful of national and international sliding events. A vocal enthusiast of such events, Doug Garnett, wrote a letter to the theoretical Premises:

1. Some Olympic sporting facilities become obsolete after their Olympic Games come to a close.
2. Obsolete sporting facilities can be harmful to the environment and the local economy.
3. Simply removing an obsolete sporting facility is not enough to lift its financial and environmental burden of the past present and future.
4. Architecture can be a valuable community asset when it meets the needs of the surrounding community.

Mr. Garnett’s letter went on to describe the glory of sliding competition. He also mentioned the upcoming FIBT World Cup races. I personally attended the second day of the World Cup. Admittedly, I, the author of this book, only made the two hour trip to take pictures of the site. The promise of large crowds seemed daunting, but time restrictions made a visit on this day an absolute. Nevertheless, I was pleased to find the track being used. Mr. Garnett was right, it is exhilarating to be up close to the action. I found a spot mere feet from the apex of the final turn in the track. I was able to stand so close to the track because, surprisingly, other than myself and the Sliding Centre staff, there were only two other people there, tourists who, after a brief conversation, revealed that they had no idea there was a World Cup race in full swing.

Though the presence of an international competition failed to draw any spectators, the Whistler Sliding Centre was thoroughly enjoyed by the athletes themselves. Dave Smith, the brakeman for Great Britain’s 2014 Bobsled team reminisces “My experience of Bobsleigh is one of pure adrenalin, speed, and excitement. I stand by my word that all roller-coasters have been ruined because of my involvement in Bobsleigh” (Smith 2012).

Figure 21: Photo of a two-man bobsled at the track exit.

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The action of the bobbed, lugen and skeleton races during the Olympics were an important part of the Olympic experience, an undeniable asset for the Whistler Sliding Centre. Despite the fact that northern city residents from around the world during the 17 days of sport (PricewaterhouseCoopers 2012), there is no doubt that the national pride felt by those watching the Games will be preserved in the future when its construction was completed in 2007 (Sportnet 2002). Other sources claim this number to be as high as $110 million dollars (this project will use the more conservative estimate). Currently, tax assessments value the Sliding Centre at just $89 million dollars. The Centre provides jobs for 26 permanent staff members (Taylor 2012). These jobs are difficult to assign sentimentality a quantitative value. Whistler City Councillor Duane Jackson remarked “You could argue [The Whistler Sliding Centre] has no value” (Taylor 2012). It could be fairly easily integrated into a new kind of facility were the government consultation, increased property taxes in the years preceding and immediately following the Games, the people who appear to be a white elephant (the Sliding Centre), business outside of the Village suffered in the months preceding the Games and during the Games themselves. The municipal agenda was completely taken over by Games-related matters for months, in fact, years before the Games (Wilhelm-Morden, 2012, personal correspondence). This has led some commentators to criticize the Games as elitist. The facilities are not only built for the competition of a small global elite of athletes, but their substructure and hard cash begins at $104.9 million Canadian dollars, which was the price that “With Whistling Hearts” is a line taken directly from the Canadian national anthem and couldn’t be a truer expression of the spirit of celebration and unity that was felt all over the world. Without the bobbed, lugen and skeleton events, the Olympics would have lacked the Games themselves were judged to be a great success, but the ski jump has since rarely been used, and several other facilities such as the bobsled tracks were completely abandoned (kikawka 1999; Terret 2006). Since 1968, the problem has become even worse. Changes in the sports themselves, such as the equipment used and the level of competition, require ever more specialized facilities (Essex and Chalkley 2004). For example, bobsled tracks have become much faster, and consequently more dangerous, over the years, further limiting their reuse outside of the full capability. For clarity, only 9.6 people out of one million are able to slide. Nine point six ten-thousandths of a percent does appear hardly justify the need for a bobsled, skeleton and luge track. However, the challenge of finding users in a post-Olympic environment should be no surprise. In an article titled “The Reuse of Sport Venues after the Winter Olympic Games”, author Heike C. Alberts, with references of his own states:“Problems with reusable facilities built for the Winter Olympic Games were first reported for Grenoble (1968). The Games themselves were judged to be a great success, but the ski jump has since rarely been used, and several other facilities such as the bobsled tracks were completely abandoned (kikawka 1999; Terret 2006). The total number of elite athletes that Alberts refers to is even smaller than you may think. The FIBT (Fédération internationale de bobsleigh et de Tobogganing) is the governing body of competitive bobsled, lugen and skeleton racing. Their website (www.fibt.com) lists all active athletes that are members of the federation. Canada is represented by a minuscule 336 total athletes in all three sliding events combined (FIBT 2012). According to StatsCan (Statistics Canada), Canada has a population of 34.9 million people as of 2012. Tax dollars gathered by the Federal government, through its tax system and other means of revenue including the lotteries, are used to help fund the Olympic effort, an effort which included the construction of the Whistler Sliding Centre. Of the 34.9 million people who paid federal taxes, which were used in part to pay for the track, only 0.00064% are qualified to use it to its full capability. The number of Provincial government of British Columbia. The total number of elite athletes that Alberts refers to is even smaller than you may think. The FIBT (Fédération internationale de bobsleigh et de Tobogganing) is the governing body of competitive bobsled, lugen and skeleton racing. Their website (www.fibt.com) lists all active athletes that are members of the federation. Canada is represented by a minuscule 336 total athletes in all three sliding events combined (FIBT 2012). According to StatsCan (Statistics Canada), Canada has a population of 34.9 million people as of 2012. 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only uses the last half of the track and will last approximately 60 seconds (Whistler Sliding Centre 2012). To put this into perspective, an adult full-day park-hopper ticket to Disneyland and California Adventure costs $125.00 (Disneyland Resort 2012).

What is the future of the Whistler Sliding Centre?

The Future plans of the Whistler Sliding Centre are "...to continue to capitalize...on the opportunity that the Olympics has given the community", according to Whistler Councillor Jack Crompton (Taylor 2012). Currently, the track is getting a $1.7 million dollar upgrade due to the death of Georgian luger, Nodar Kumaritashvili in 2010. The track, which was determined to be too fast is effectively being shortened and lowered. A new starting ramp and a new two story start house are being constructed, which duplicates the existing start ramp and two story start house. Annual operating costs are upwards of 2.76 million dollars. In 2011, the Center suffered a 2.2 million dollar shortfall since it only generated $578,000.00 CAD in revenues from public sled rides, competition fees and training fees. This deficiency will be taken from Provincial tax revenues.

Locally, the taxes the Centre should pay annually amount to approximately $500,000.00, just under its total income. Fortunately for the Sliding Centre, it has been granted tax exemption for all five years it has been in operation (Taylor 2012). With a tax exemption being granted every year, no path exists for Centre revenue to ever make it back to the Provincial Government - even if it could afford it. Plainly speaking, the Whistler Sliding Centre is losing millions of dollars every year during normal operation, and has invested an additional 1.7 million to ensure that this un-profitable operation can continue, albeit in a safer manner. The high cost of running the Centre and its general lack of usefulness have made it an obsolete sporting facility.

Can obsolete sporting facilities be physically harmful?

The day before the opening ceremonies of the 2010 Winter Olympics, Georgian luger Nodar Kumaritashvili was killed when he was thrown from the track of the Whistler Sliding Centre and hit a column that supported the tracks separate roof structure. "Officials immediately closed the controversial run, which is known for its high speeds, often reaching 150km/h. (Longley 2010). In another article, Australian born luger Hannah Campbell-Pegg said "I think they are pushing it a little too much...To what extent are we just little lemmings that they just throw down a track and we're crash-test dummies? I mean, this is our lives." (Snyder, 2010) Though I am relatively certain that no one ever tried to throw Ms. Campbell-Pegg down the sliding track, her outrage and alarm at not only the death of Nodar Kumaritashvili, but at the now lethal speed of the track was also felt by all the athletes and the general public.
The death of Mr. Kumaritashvili was in no way a consequence of an obsolete sporting facility, rather, it demonstrates its potential for causing injury. After all, Mr. Kumaritashvili was a trained athlete performing a practice run under the scrutiny and supervision of a fully operational sliding centre; should the Whistler Sliding Centre ever fall into ruin, it could never be left intact and unsupervised, it would be too great a liability.

Can obsolete sporting facilities harm the environment?

According to WorksafeBC, ammonia refrigeration plants (the system used to keep the sliding track frozen) can be potentially dangerous if the ammonia finds its way into a person's body. However, Ammonia is a natural and environmentally compatible chemical that can be recycled or neutralized (WorksafeBC, 2007). With no major chemical threat, the second biggest concern would be dealing with the massive track itself and the various buildings and roads on the site. Ultimately, a decision would need to be made concerning the future of the facility, were it to be deemed obsolete to the point of closing down - a point that seems inevitable.

One option for addressing the obsolete facility would be to dump the 2000m³ (2616yd³) of concrete track into a landfill. Its volume would amass to a little more than a staggering 41’x41’x41’ solid cube of concrete. Other, more responsible options include demolishing and crushing the concrete track to be recycled as aggregate in another concrete application. Various degrees of full or partial disposal and recycling could be possible based on cost vs. benefit models. Alternatively, the disposal of the entire track could be avoided if another use for it could be found.

In what state are bobsled tracks worldwide?

In Cesana, Italy’s 2006 Winter Olympic equivalent to Whistler, the Italian sliding centre has been scheduled for closure and demolition. “A faltering economy and distance from a major population centre were factors in Cesana’s demise.” (Kingston, 2012). An article in alpMedia gives more information.

“It costs 1,500 euros a day to maintain the bobsleigh run that was built specially for the 2006 Winter Olympics. That equates to over 40,000 euros a month for a facility that is scarcely ever used... its building alone cost 102 million euros. Demolition including the disposal of the 46 tonnes of ammonia required for producing and cooling the ice will devour another 220 million euros....it is ultimately always the taxpayer who stumps up for infrastructure projects of this kind. The people of Piemonte have now paid dearly for the lesson. Will a gold medal at the next Winter Olympics be suitable compensation?” (alpMedia, 2012)

In conclusion, the harm caused by an obsolete sporting facility can be subtle, but significant. The harm it will do is not singularly catastrophic, but its slow consumption of millions of dollars, and its wasteful existence need to be countered. Fortunately, these problems...
What are the future options (and their consequences) of an obsolete sporting facility?

As mentioned before, some options for the future of an obsolete sporting facility could be:

- complete demolition and disposal
- complete demolition and recycling
- partial demolition and disposal
- partial demolition and recycling
- complete demolition and creation of something new
- partial demolition and creation of something new

The first four of these options effectively end the problem, but they offer no way for the losses to be recovered. The last two options begin to address the losses by providing an opportunity for something new to make use of the property, to address local issues and to generate a profit.

The financial situation of the Whistler Sliding Centre broadly resembles the economics of obsolete buildings in Detroit, Michigan. Due to the closure and relocation of major industrial production facilities, many thousands of people have been left without jobs. As a consequence, these people have moved away or fallen into poverty. This social and economic upheaval has left roughly 90,000 homes unoccupied.

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Research Results and Goals

The legacy left by the Olympics in Whistler is one of debt and disuse. These qualities are vehemently antagonistic to the vibrant spirit and excitement that came with the 2010 Winter Games. It can be argued that preserving the Olympic spirit can be best achieved by transforming one of its facilities into something other than its intended use, something that is more aligned with the spirit of the Olympics. An excellent example of a positive and lasting Olympic Legacy is the Whistler Olympic Plaza. The large covered stage was originally where Olympic champions were presented with their medals. After the Olympics ended, the large outdoor stage is used for concerts in the summer and becomes an ice skating rink in the winter. Large screens can be set up and used to broadcast the Olympic games every two years as well. The Plaza has become the focal point of the village of Whistler. It is surrounded by boutique style shops and restaurants and includes an ADA playground that is enjoyed by children and adults of all abilities.

What is a valuable community asset?
This project will define a valuable community asset as something that sustains, contributes to, or furthers a group of people who identify themselves as belonging together. The specific areas addressed will include:

What is a valuable community asset?

Environmental Needs:
"In Whistler, over 70 percent of our original wetlands have been lost to development or draining. The Millar Creek and Alpha Creek wetlands (found South of Creekside and in an area often referred to as the Zen lands) represents the largest remaining wetland within Whistler's developed boundaries. As with all environmental systems, these areas cannot be considered in isolation, and wetlands in particular, are extremely sensitive to changes in the areas that surround them or have impacts upon them." (Ruddy, 2012)

Introducing two natural purification systems into the master plan of Thunderbird Centre Resort is an excellent opportunity to offset the destruction of natural wetlands in Whistler. Natural purification systems such as bioswales and constructed wetlands also make for excellent park and garden areas. Populating these areas with informative signs can educate the public about wetlands and their importance in the ecosystem.

Governance Needs:
The stone walls, wood burning hearths and timber framed hotels of Whistler allude to Swiss Chalets, Half-timbered Houses, Romanesque architecture and French Châteauxs of the 17th century. The end result is a mix of very modern hotels robed in the romantic styles of fable, fairytale and history.

In similar fashion, simply ending the expenses of the Whistler Sliding Centre is not enough. A plan to transform the Sliding Centre into a revenue generating entity can not only recover lost money, but could also be a major source of profit since its debts have been paid.

Residential lots vacant. Mayor Dave Bing plans to address the rapid down sizing of the city by demolishing abandoned property with federal bailout money. When it's all over, said Karla Henderson, director of the Detroit Building Department, 'There's going to be a lot of empty space.' Mr. Bing hasn't yet fully articulated his ultimate vision for what comes after demolition, but he has said entire areas will have to be rebuilt from the ground up. For now. his plan calls for the tracts to be converted to other uses, such as parks or farms. (Kalogg 2010)

The approach Detroit Government officials are taking involves spending a great deal of money to address the symptoms of a bigger problem. The implementation of a plan that not only halts the harm, but also reverses it has yet to be put in place.

The legacy left by the Olympics in Whistler is one of debt and disuse. These qualities are vehemently antagonistic to the vibrant spirit and excitement that came with the 2010 Winter Games. It can be argued that preserving the Olympic spirit can be best achieved by transforming one of its facilities into something other than its intended use, something that is more aligned with the spirit of the Olympics. An excellent example of a positive and lasting Olympic Legacy is the Whistler Olympic Plaza. The large covered stage was originally where Olympic champions were presented with their medals. After the Olympics ended, the large outdoor stage is used for concerts in the summer and becomes an ice skating rink in the winter. Large screens can be set up and used to broadcast the Olympic games every two years as well. The Plaza has become the focal point of the village of Whistler. It is surrounded by boutique style shops and restaurants and includes an ADA playground that is enjoyed by children and adults of all abilities.
Whistler Village is a modern manifestation of the quintessential European village. It has followed this style in an all encompassing manner; however, it still lacks an incredibly important feature common to most villages of antiquity: a castle.

"In the late eleventh and early twelfth century, the impressive appearance of [castles] (in particular those with towering motes) served as cultural markers, proclaiming and legitimating territorial control and expressing the cultural identity of a new elite." (Creighton, 2002)

Like the buildings that populate Whistler Village, an allusion to style and purpose is what is important rather than a literal duplication of the medieval castle. This symbol of authority and direction has become necessary because of one thing: the Olympics. An organization called One Whistler is a conglomeration of four entities: The Resort Municipality of Whistler; Tourism Whistler; The Whistler Chamber of Commerce; and Whistler Blackcomb Holdings Inc. During one of the organization’s meetings, chairman Ray Longmuir said:

"As a community we are all moving in the same direction. It used to be we were moving towards the Olympics and we had that defined goal in mind. Now we’re all moving toward something and I truly believe it is a greater Whistler, but we don’t have that common vision of what that greater Whistler is." (French 2011)

The pro-active transformation of the Whistler Sliding Centre would be a visible gesture that everyone in the Village could observe. Establishing a castle that addresses the expectation of financial responsibility and demonstrates that Whistler is a community worth investing in is. This is an important step for the city as they transition from being a place defined by the Olympics to a place that is defined in and of its own unique nature, of which the Olympics were just a small part. In this way, Thunderbird Centre Resort can become a castle through its ideals and design considerations, showing leadership in areas of financial stability, bodily health, recreation, community, and responsible and environmentally sensitive lifestyles.

Establishment:
Whistler’s ever growing community has surpassed the definition of a rural or a remote community. Amenities such as movie theaters, higher education, diverse places of worship and fitness facilities will continue to be added. One Whistler is a conglomeration of four entities: The Resort Municipality of Whistler; Tourism Whistler; The Whistler Chamber of Commerce; and Whistler Blackcomb Holdings Inc. During one of the organization’s meetings, chairman Ray Longmuir said:

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Figure 27 - Photo of Whistler’s untamed backcountry

Are there untapped resources?
Whistler, attracting and retaining tourists is very important. In the same One Whistler meeting previously mentioned, past mayor of Whistler Ken Melamed exclaimed “The resort is sized to accommodate about 75,000 people and Whistler currently experiences about 55 percent occupancy. The goal is to move to 65 percent occupancy” (French, 2011). One of the ways that this group of leaders plans to do this is by broadening its services. Fiona Fumaluk, president of Whistler’s Chamber of Commerce said “We want to broaden the impact of service so that its embraced by as many people as possible and that doesn’t just mean the folks in the business community but it means the community at large.” (French 2011) One excellent way to broaden the available services is to tap into underutilized resources, and there is one such resource that comes to mind.

By addressing Whistler’s needs as a community, Thunderbird Lodge can become a valuable community asset.
Figure 28 - Photo of the Westin Resort and Spa. A good example of Whistler Architecture
Introduction

This thesis project was originally going to be a hotel. It seemed to be the right decision, but the more I learned about Whistler, Whistler’s needs and the Whistler Sliding Centre site, I reluctantly conceded that the project I wanted to design wasn’t actually going to work. After putting my personal wants aside, the Thunderbird Centre Resort was born.

The first design, called Thunderbird Lodge, was to be a hotel/day lodge/youth hostel/adventure tourism outpost/centre. Complex programs such as the one proposed for the original Thunderbird Lodge are common in the hotels of Whistler Village. Unfortunately, this model is not universal. Instead, a more reserved approach was taken. The functions of these complex programs were split up and allocated to individual buildings on the Whistler Sliding Centre Site. This gesture more efficiently re-used the existing buildings, saving all but one of them from demolition.

Some of the following case studies were chosen to inform the design of the original Thunderbird Lodge, not its successor, Thunderbird Centre Resort and the Thunderbird Fitness Centre. Yet, their merit stands. Instead of excluding them, I have elected to leave them in this document as milestones that mark the evolution of the project.

The first three meet specific case study requirements assigned for this thesis. Those that follow are more casual and explore aspects of design that closely relate to Thunderbird Centre Resort.

Caltrans District 7 Headquarters by Morphosis best shows the relationship between varied public spaces and more specific private spaces. The public spaces need to be exposed and visible where the private spaces need to be efficient and orderly.

Murcia Town Hall by Rafael Moneo is a good example of strong but not dominant government presence. Visible leadership shows active leaders and softens the relationship between government and the public.

The Athenaeum by Richard Meier exhibits efficient circulation for a tourist building. People who are unfamiliar with a place need to be told where to go.

The Hilton Garden Inn gives insight into the functions and their interrelationships of a place of hospitality, accommodation and amenity.

The Squamish Adventure Centre exhibits the beautiful possibilities of West Coast Timber.

The Queen of the Valley Hospital Wellness Center provides a thorough example of a fitness facility plan giving examples of its necessary spaces and how they are arranged.

Whether directly or indirectly, each building contributed to its community in some significant way. Each building is also quite unique which goes to show that a community needs many things and anything that can meet those needs has great value.
Caltrans District 7 HQ
by Morphosis

Introduction
Caltrans District 7 HQ is the moniker for the headquarters of California’s Department of Transportation’s district 7 operations. The building is primarily offices, but it also has an exhibition space, retail, cafeteria, warehouse, autoshop with yard, day care, wellness center and public plaza. The building has 1.2 million square feet of floor space.

The Headquarters’ design was inspired by the automobile, a fitting decision for a center dedicated to transportation. The double skin mimics the shell of a car. The outer aluminum shell is perforated. Operable openings give users the ability to control the amount of light and air that enter their workspaces. “The fundamental reading of the building is in terms of transformation”. The open floor plan gives all areas equal access to sunlight. (Morphopedia 2009)

Figure 29 – Map of Los Angeles (Bing Maps 2012)
Figure 30 – Caltrans District 7 HQ Building (Geographer, 2009)
Figure 31 – Caltrans District 7 HQ Vignettes (Borden, 2010)
The Caltrans District 7 Headquarters building stood out to me because its ability to transform; a mechanism that allows it to adapt to the tastes of individual users. The transformations that Thunderbird Lodge will attempt are more or less permanent changes, but this building shows that transformation can continue to touch the individual users long after construction has been completed. Caltrans’ second outer skin’s primary purpose is to limit the amount of sunlight that can enter the building. In Whistler, the site, which sits between two mountains, will have no such problem. A skin that amplifies the amount of natural light that penetrates the building would be much more advantageous.

The heirarchy of the Caltrans building is almost non existent as far as surface material conditions are concerned. The circulation in the above drawing shows the openness of the Caltrans floor plan. Since Thunderbird Lodge’s program is broader than a generic single-use building, the openness would be a great way to make the different program elements available from a central space. Like the Caltrans building, the cluster of varied program elements tend to be near the ground where they can be most easily and quickly accessed. As the programmatic elements become more specialized and exclusive (the office spaces), they tend to radiate away from the entry point since exposure to them is not necessary. Thunderbird Lodge’s hotel rooms could be similarly placed.

As mentioned before, getting adequate natural light into the building may be a challenge because the mountains adjacent to the site as well as the commonly occluded climate offer little light to begin with. Caltrans’ careful light control would be counterproductive in a setting such as the Whistler Sliding Centre.

Geometrically speaking, Caltrans is unremarkable. Structural bays form perfect squares which are repeated until the general shape of the site has been more or less covered. In conclusion, Caltrans District 7 Headquarters is most valuable as a study in spatial organization. Its exposed public spaces and enclosed private spaces are a model for Thunderbird Lodge.
Introduction

The city of Murcia lies on the Southeast coast of Spain. The town hall is actually an annex that supplements a larger municipal building. The plan below shows the open entryway, offices and the main lecture hall and its projection box. It also shows the lowered deck below the main facade. The elevation shows the building’s most prominent feature, a face that forms part of a wall that defines a city plaza. The face competes with two ornate churches in the square it borders.
Case Studies

Murcia Town Hall

Analysis

Murcia Town Hall very closely represents the same presence of authority that Thunderbird Lodge will have in order to meet the governance needs of the people of Whistler. Murcia’s greatest asset to this end is its central location, something absolutely necessary when public visibility is important. The main facade of the Town Hall is simple yet interesting. The implied lines are consistent, but broken up, creating interesting irregularities. Its materials are soft, yet their staunch arrangement maintains the building’s institutional sense. This sense of soft yet strong is a good way to show strength without dominance and would be a good way to surround the glazing of the event space in Thunderbird Lodge, the space meant to hold city council meetings in a visible and transparent way.

Murcia Town Hall can be broadly described as two rectangular prisms intersecting each other at a slight angle even though the geometry diagram shows greater detail. No direct massing or geometric correlations need to be made. Like the Caltrans building, Murcia Town Hall gathers users into a large space and displays multiple program elements at a time. From this main space, users can choose which space they need to visit and then go there with ease. It is also worth noting that the building’s primary function is located on the ground floor. Unfortunately, users in wheelchairs or users with mobility issues are forced into the front row of the small auditorium. It is also worth noting the lack of toilets (2).

Considering the amount of people this building can hold, Murcia also resembles Caltrans in section, with the variety of individual and public functions near the ground and the more private and specific spaces repeatedly stacked above. This doubly reinforces my inclination to utilize a similar layout. A tiered auditorium allows for better views of the stage, but limits versatility. Where Murcia’s council meeting space is dedicated to that purpose, Thunderbird Lodge’s is not, it will need to facilitate events of varying natures. To this end, a flat floor is best. Removable risers and other such seating arrangements can be further researched once the design has progressed to that point.

Structurally, columns are placed on the exterior walls allowing beams to span in the short dimension. Murcia Town Hall’s auditorium, like most presentation spaces, requires darkness to facilitate projection. Therefore it has no windows. This cannot be the case with the event space in Thunderbird Lodge since visibility and transparency are an integral part of using the space as a city council meeting place. The need for views in and out, as well as the need for clear projection will need to be addressed in the design phase.

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Introduction

The Atheneum is a visitor center in the historic town of New Harmony, Indiana. It orients and educates tourists about the city. A continuous ramp directs users through the building. The path ends with a long exterior ramp that propels visitors into the city of New Harmony. (Svieven 2011)
The Atheneum’s focus on tourists makes it a good study of spaces dedicated to tourism. The entire project is a clustered organization of singular spaces. In this sense it resembles the Caltrans and Murcia building, but without the repetitive private spaces on top. Oddly, the center is owned and run by the University of Southern Indiana instead of the city itself. The most noticeable features of this building are its ramps. The coiled interior ramp brings tourists to each space in a very controlled way. They exit the building at a small balcony where a great view of the city can be had. Coiled staircases continue to control the path of movement downward until the last length which straightens out and practically shoots the tourists into the main part of the city. The controlled nature of the Atheneum’s pedestrian path seems restrictive, but for the purpose it serves, it’s quite effective. Visitor centers primarily want to advertise local amenities. They hope to bolster local business. Controlling exactly how their city is perceived is a clever marketing strategy. Naturally, the large service desk can be clearly seen from the entrance of the building. Thunderbird Lodge doesn’t need to be nearly as controlled. Local Tourist centers such as the Squamish Adventure Centre and the Lil’watt Cultural Centre do this well enough. A smaller degree of control is still required. I can foresee the possibility of chaos in an open entry space were it to lack any pedestrian guiding elements. The massing of the Atheneum appears clustered in the diagram, but in plan, a series of grids make the building much more unified. The result is an exterior that lacks repetition with many unnecessary decorative elements that only lend themselves to Meier’s aesthetic inclinations. The Atheneum’s building section shows a large open space near the center of the building. This space seems to be quite grand and enjoyable to be in. The entry space in Thunderbird Lodge would benefit from a similar concept. Structurally speaking, the grid layout of the columns have not informed a monolithic building form. Instead, Meier was able to create his angled protrusions within an ordered framework. A similar approach will be taken towards the structure of the Lodge. The many large open spaces are naturally bathed with ample sunlight. Not only do they let the direct sun reach farther into the building, they also let indirect light travel with less reflections. The reflective nature of the abundant white surfaces also helps with this, which is a good reminder about using a material’s colour to affect light. The form of the building responds to instinct and Richard Meier’s own design vocabulary rather than a set of geometric rules. This works to their advantage since unique buildings seem to attract people, which is a very good thing when you are trying to attract tourists. The white angular building also contrasts beautifully with its green and blue surroundings. In this case, standing out from the environment seems to be a good way to look like it belongs.
Figure 38 - Hilton Garden Inn perspective rendering (VanDeWalle, 2012)

Figure 39 - Hilton Garden Inn 8th Street perspective looking East (VanDeWalle, 2012)
The Hilton Garden Inn is a good example of architecture that adds assets to a community through transformation. The Existing site once served a purpose (parking), but has become a burden on the local community. Its aesthetic ugliness didn’t need to be tolerated anymore because the development of the area created sufficient parking at alternative sites. Immediately obvious are the exterior articulations which respond to the different room types on the interior. The connection between room type and articulation is interesting, but without a building plan, that connection would likely never be made by any guests of the hotel. Perhaps in this situation an obvious connection isn’t what’s important, rather, the important lies in an exterior aesthetic that responds to programmatic requirements instead of a more arbitrary reason such as ‘it looks good’.

These primary materials are used: brick, in red and brown; metal paneling; and stucco in tan and brown. The composition of so many materials can be complicated to balance, but VanDeWalle Associates managed that this building’s composition was successful because they appear to have set up a hierarchy of materials, which is a set of rules that govern the placement of materials. The two colors of brick are consistently placed near the base of the building. By putting the heavier material near the bottom, the building has a sense of a heavy bottom and a lighter top, which phenomenologically aligns with our understanding of gravity. This logical approach to hierarchy is common in the vernacular architecture of Whistler, which is based on European Alpine village construction techniques, which wasn’t based on anything other than the simple construction techniques known at that time and the materials available. As a result, strong stone foundations support timber frames with interior and exterior partitions placed between the structural columns. Currently, new buildings mimic this hierarchy by attaching stone and wood elements to the exterior of a steel frame or concrete frame building. In the pursuit of the Health, Safety and Welfare of a community, a truthful building with expressive structure that closely resembles original Alpine Village construction techniques. Adhering to a more traditional approach to structure and material choice creates a building of great quality and character—a building that would likely be re-modeled or ‘transformed’ should its first function ever cease to be viable. Were the building constructed in a cheaper and faster way, it might set a precedent of brevity, rather than a precedent of long lasting legacy.

When it comes to spatial organization, a very clear and logical floor plan is employed. Hotel guests enter through a vestibule on the North
A secondary entrance exists to accommodate traffic to and from the banquet rooms. Having separate entrances for the two main functions of the building (hotel and event centre) ensures smooth traffic flow without the two getting in the way of each other.

Hotel guests first enter a pavilion area which acts as a circulation hub of the building. From the pavilion, all major areas accessible to hotel guests can be easily accessed. The circulation diagram below shows how the building’s two functions have been given their own half of the building, with shared function spaces in the middle. When applied to a fitness centre, this same approach can be used. Instead of individual hotel/event functions, individual male/female changeroom functions will equally divide the building’s spaces. Between the two would lie the shared function spaces such as exercise areas, rock climbing areas, reception areas and swimming areas.

It is also interesting to note that from the guests entrance, the first thing seen is a hearth which is a classic symbol of the home and hospitality. No doubt this is a welcoming gesture that hopes to set the scene for the guests of the hotel. Fortunately, the first thing that event guests will see is the bar. This makes sense though; a hotel intends to make money, and alcohol sales to guests who are not staying in the hotel are almost pure profit. The lesson here is to place money making functions in prominent places to ensure the financial success of a facility.

From the main doorways, hallways generally decrease in width the farther into the building they run. Presumably, hallway widths are determined by predicted volume of traffic.

Assume for a moment that the organization of this hotel can exist.
without shared walls. Could the organization be extrapolated to inform the design of an entire resort? I think it can. Both Hilton Garden Inn and Thunderbird Centre Resort have an entry, a reception area, public space and private units. Hallways become roads, rooms become buildings and instead of walls dividing space, a piece of tree-covered land.

The spatial organization of the Hilton Garden Inn can even be abstracted into a bubble-diagram that can be used to inform any project of similar typology. This generalization can be seen in the diagram to the left.

The second floor consists of hotel rooms and their support spaces. Stair towers for egress are properly located at the extremities of the building, providing the most opportunities for escape in case of a fire. Plumbing wet walls are located near the centre of the building, away from the cold exterior and the valuable exterior surface that is best used to hold windows.

When considering the profitability of a design, repetitive elements help bring down the cost of design and construction. Repetition of hotel rooms and cabins alike can achieve this.

The Hilton Garden Inn is a great example of efficient hospitality design, and its framework of organization is a good model to use as a template for the Thunderbird Centre Resort.
The Squamish Adventure Centre can be found in the middle of the Sea-to-Sky highway that connects Whistler to Vancouver. The Centre is a cafe and gift shop as well as a cultural museum, excursion booking centre and offices. The two additive cylindrical forms are interesting and attract many tourists who drive by.

The Squamish Adventure Centre is a good example of the possibilities of timber and glue-laminated timber construction. Softwood lumber is one of the Province of British Columbia's most plentiful natural resources. It is a vernacular building material, it is renewable and it is incredibly expressive.

Even in a circular building, a hierarchy of columns, girders, beams, purlins and decking have been used to establish order and repetition. Unfortunately, the picture on the top right shows what can happen when trying to place square rooms into a building with radially placed beams; Awkward corners and connections can be created.

The warm tones of the wood are aesthetically beautiful. The wood itself is pound for pound stronger than steel and is naturally fire rated for one to two hours. Glulam members are incredibly environmentally friendly because even the largest mass is made up of smaller dimensional lumber that can be harvested from third or fourth growth forests. The pre-dried lumber in combination with the adhesive makes the members strong and resistant to warping or checking. The members are also very water resistant. (American Institute of Timber Construction, 2012)
Introduction & Analysis

Spatial organization of this fitness facility is centered on the reception area, which acts as a hub of traffic that connects the lesser spaces. The circular reception area even influences floor material patterns and wall articulations beyond its own defined space. Connecting spaces in this manner helps unify the design. The locker rooms provide direct access to the pool areas as well as the other fitness areas. This helps separate wet areas from the rest of the building. Fitness desks and customer service desks can see and be seen by every freely public fitness area. It’s also important to note the social spaces in the locker rooms, an area that facilitates the social aspects of a wellness center.
Introduction & Analysis

North Dakota State University’s Wallman Wellness Center is home of campus recreation, exercise, medical services and disability services. In addition to the fitness facilities, the building includes a small medical center and pharmacy, as well as disability services and childcare for the students and faculty of NDSU. The Fitness areas themselves are large enough to accommodate the 3,500 students and faculty members that access the building per day. (Fisher, 2013) The Fitness areas include large weightlifting areas, cardiovascular exercise areas, a three story rock climbing wall (Fig. 61), three basketball courts, a multiple activity gym for indoor soccer and roller hockey, spinning studios, personal training studios, martial arts studios, dance studios, four squash courts and two indoor running tracks.

In an effort to create a natural and energy efficient environment, daylight is carefully captured and controlled. Overhead skylights have been treated to diffuse the light that enters the building through the roof. As a result, no direct beams of light create distracting hot spots on the courts, floors, sports equipment or other active surfaces. However, I feel as if a great opportunity has been missed. The large rock climbing wall, which is constructed of shotcrete and mesh on a steel structure could be used as a large heat sink which could very effectively harness direct solar radiation during the day, and re-radiate that heat during the night, passively heating the building. Direct light on the rock climbing wall would also make the experience closer to real rock climbing in the outdoors.
In a conversation with Gary Fisher, the Wellness Center’s Director, I asked about the planning and construction of the building which he was a part of. The building was designed to be as efficient and cost effective as possible. This is evident by the lack of circulation. Though this has saved them money, athletes have to walk through other dedicated areas to get to their area of interest. For example, the spinning studio and martial arts studio can only be access by walking across the gymnasium floor. Additionally, people constantly cut through the large weight lifting area to access the locker rooms, which is bothersome to those exercising.
**Case Studies**

**NDSU Wallman Wellness Center**

**Comprehensive way-finding** that can be clearly seen from as many areas as possible.

**Natural daylight without distracting views.**

**Trainer desk that has views to all exercise areas**

**Large circulation areas allow for high traffic volumes.**

**Even and consistent lighting.**

**Mirror walls on just one side or a space to prevent the infinity effect.**

**Safety equipment (like this AED) in a visible and accessible place.**

**Large and consistent flooring with smooth transitions to prevent tripping.**

**Placing that facilitate the social aspects of exercise yet doesn’t interfere with others.**

**Orientation is important when placing equipment.**

**Lessons Learned**

- Mechanical systems should be hidden or expressive, not placed for convenience.
- Equipment storage should be organized and easy to access.
- Each piece of equipment requires ~50 sq.ft. movement on and around equipment should not affect others.
- Water fountains and washrooms should be plentiful and easy to see.
- Personal training studios need to be large, even if they are serving just one person.
Introduction & Analysis:

DESIGNworkshop is a multidisciplinary firm based in Aspen, Colorado, USA. The firm, which designed this master plan for Grand Targhee Resort also designed the original plan for Whistler Village as well as all subsequent major community plans since then.

Grand Targhee shares a similar climate and separation from major metropolitan areas with Whistler.

In the master plan for Grand Targhee Resort, prominent ski-ways cut through the landscape in much the same way that roads do. It’s important to note that while roads can direct traffic in two directions up and down the slope of the terrain, a ski way can only direct skiers and snowboarders in one direction, the downslope direction.

Integration with nature, in this plan, seems a secondary consideration. Take for example the presence of a ski lift station in the midst of a wetland, or the variable angles of the repeated buildings oriented to fit the curve of the road rather than to take advantage of the available solar energy.

The residences surround a central hub of activity, much like the suburbs of a large city. Though this compartmentalization of activities is efficient, it seems to discourage interaction and diversity at the macro scale. Thunderbird Centre Resort will employ a degree of separation between the more public and private spaces, but the presence of activity areas will be placed throughout the master plan to encourage a localized interaction of the residents, temporary and permanent.
Historic Context
In the 1960s, a group of Vancouver business men had the ambitious notion to bring the Olympics to British Columbia. These men formed the Garibaldi Olympic Development Association and were led by Franz Wilhelmson. The group chose London Mountain in Garibaldi Provincial Park (just minutes south of Alta Lake) as an ideal site. Unfortunately, the area didn’t have a many buildings, any infrastructure or public services. Development was large enough to support a handful of saw mills and various lumber operations. Naturally, the abundance of trees led to logging. The mineral rich land of British Columbia also brought several mining operations.

Alex and Myrtle Philip ran Rainbow Lodge Fishing Resort until 1948. They sold the lodge to another couple, Alec and Audrey Greenwood. The Philips, though retired, decided to continue to live on Alta Lake for the rest of their lives. Alex, who passed away in 1968 lived to be 86. Myrtle lived to be 95. One of Whistler’s elementary schools still bears her name.

As fortune would have it, the Pacific Great Eastern Railway from Vancouver managed to lay track as far as Alta Lake. Now, instead of a day aboard a steam ship and a two day hike, people could get from Vancouver to Alta Lake in a single day aboard a train.

Figure 65 - Photo of John Millar at his Cabin in 1911 (Whistler Museum, 2012)
Figure 66 - Photo of Myrtle and Alex Philip in 1911 (Whistler Museum, 2012)
Figure 67 - Photo of Rainbow Lodge in the 1930’s (Whistler Museum, 2012)
Figure 68 - Photo of Parkhurst Mill 1936 (Whistler Museum, 2012)
Figure 69 - Photo of Alex and Myrtle Philip 1955 (Whistler Museum, 2012)
Figure 70 - Photo of construction of the Roundhouse Lodge 1965 (Whistler Museum, 2012)

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Figure 69 - Photo of Alex and Myrtle Philip 1955 (Whistler Museum, 2012)
Figure 70 - Photo of construction of the Roundhouse Lodge 1965 (Whistler Museum, 2012)
The Garibaldi Olympic Development Association created a sister organization called Garibaldi Lifts Ltd. which began to raise funds and build a ski area. In 1955, London Mountain was officially renamed with its local nickname, Whistler Mountain. Hoary marmots (which look similar to gophers) were found in abundance there. The mountain was called whistler after the marmots whistle-like call.

The Provincial government had completed a gravel road between Vancouver and Alta lake. They also, finally, brought electricity to the area. On January 15, 1966, the Whistler Mountain ski area opened. And, with the new ski area, local development around Alta Lake exploded. The mix of new buildings among the older pioneer lodges left many of the older buildings to ruin. However, these buildings were quickly occupied by ski loving squatters.

On September 6, 1975, the Provincial Government of British Columbia created the Resort Municipality of Whistler. The new municipality was established to bring local government to the quickly expanding area.

In 1977, development proposals for a ski area on Blackcomb mountain began. Soon after, a community plan to create a tourist village at the intersection of Whistler Mountain and Blackcomb Mountain was created. At this time, the intersection of these mountains was the municipal garbage dump.

In 1980, Blackcomb Mountain opened as a separate ski resort. Together, Blackcomb and Whistler became North America’s largest ski area. Consequently, the area’s rapid rate of expansion accelerated yet again.

The Olympic ideals of Peace were not always upheld to Pierre de Coubertin’s standards. In 1936, Berlin, Germany hosted the Summer Olympic Games. Hitler, the antisemitic dictator of Germany used the Games as global propaganda, proclaiming the greatness and strength of Germany while hiding his racist and tyrannical agendas. The torch relay, which is a publicity event that covers the entire host country was invented by the Nazis, and it continues to be a popular Olympic tradition to this day.

Figure 71 - Photo of construction of the current Whistler Village (Whistler Museum, 2012)

Figure 72 - Photo of Hitler opening the 1936 Olympic Games (United States Holocaust Memorial Museum, 2012)
Site Analysis

Figure 73 - Aerial Photo of the Whistler Sliding Centre, looking North East
Narrative

The picture on the opposite page depicts a decaying remainder of the 2010 Winter Olympics. This piece of land art sits on an earth berm that separates the Visitor Centre of the Whistler Sliding Centre from its mountain access road. It is a near perfect metaphor of the impact the Olympics had on this land.

The Olympic Symbol, cast from concrete, sits as a foreigner on the small hill in much the same way the concrete sliding track sits on the base of Blackcomb Mountain. Both stood as proud monuments to the spirit of the Olympics, but now, two years later, the weeds have begun to set in.

The land may be overtaking the foreign monuments, but nature cannot reclaim the memories these monuments represent. Even if these objects were to disappear completely, people would remember the Olympics. Memories that are tied to land have a strong presence in the minds of those who remember them, but the memories tied to the base of Blackcomb mountain are much older than the Olympics. In the infinite scale of time, the 17 days of Olympic events were a mere moment. Other features, such as the bedrock, the soil, the trees and the views of this particular site have a much greater claim to the legacy of this land than the Olympics do.

It is for these legacies, the true nature of the land, that Thunderbird Centre Resort is to be ultimately allied with. The very name "Thunderbird Centre Resort" is an allusion to a spirited creature acknowledged by Canada's First Nations people. Thunderbird's verisimilitude is not in question. The creature is much more than an ancestral fairytale. Thunderbird's spirit, authority, provision, intelligence and transformative nature are all qualities of the land. Thunderbird does not represent the land, he is the land. I included the graphics in the front matter of this book to help illustrate this.

Thunderbird personifies the land. He helps us give words to the sublime qualities of rocks, trees and dirt.

In this site analysis you will find many quantitative values that describe these rocks, trees and dirt in a reasonably predictable way. These numbers help define a set of criteria that a building must meet for it to survive and succeed. For example, the walls of Thunderbird Lodge must be able to mitigate the warmth of summer or the cool of winter in order to maintain an interior temperature that is livable for humans. These insulated walls must be strong enough to bear the weight of heavy snow fall as well as remain impermeable to the incredibly moist environment of the Pacific Northwest. Building materials must be hardy and beautiful. They must be hardy to survive the abrasive elements of the Coast Mountain climate and they must be beautiful in order to even begin to compliment the unsurpassable natural beauty of the forest covered mountains.

It is important to note that controlling the site would destroy the wild character that makes it so attractive as a tourist destination. Integrating the new resort elements into existing infrastructure and natural processes is in the best interest of everyone and everything involved. One way to do this could include harvesting the rainwater that falls on the building. It could even be taken from the small creek that runs through the top (South) of the site. After being used in...
the building, it could be directed into the purifying bioswale system being proposed. In the end, the same water that would have flown uninterrupted through the site is instead temporarily redirected to serve a human function, then returned into the ecological path it was originally on.

The few examples given in this narrative show the opportunities of the site as well as the lengths I intend to take the integration of Thunderbird Lodge into the site. The following information and its analysis will further explore the quantitative and qualitative aspects of the site and how this information should inform the design of Thunderbird Centre Resort and the Thunderbird Fitness Centre.

Proposed Building Site

This is a panoramic photograph of the land enclosed by the final turn of the bobsled track. On the upper left hand side of the image, Blackcomb Mountain continues to rise in elevation. Whistler Mountain can be seen in the top middle of the image. The final turn, named Thunderbird, of the Bobsled/luge/skeleton sliding track encloses the space in a near perfect circle.
The Whistler Sliding Centre and its six main buildings were designed by Stantec Inc., which is an international multi-disciplinary design firm. The existing buildings will be transformed to facilitate new functions pertinent to a resort development.
The Whistler Sliding Track by Stantec Inc.

Sliding Track Analysis

The 1700m (1860 yd) long sliding track is a concrete chute with intensive interior reinforcing and over 100 km (62.5 miles) of coolant pipe. The section profiles vary from a simple trough 26” in height to large curved walls that stand 11’-6” tall. As it stands, the track is uninterrupted from start to finish; Crossing the track is done through three tunnels and one bridge. (American Shotcrete Association, 2008)

The yellow image to the right shows the large impact the construction of the track had on the environment. The Tracks ‘U’ shape and relatively shallow slope make it an excellent conveyor of water. With minimal modifications, the track could be turned into a linear bioswale that naturally detoxifies roof and road runoff before returning to the natural watersystem of the surrounding terrain. This uniquely shaped piece of infrastructure is not suited for blackwater treatment that a living machine system could provide. Nor is it suited for intense water treatment that a natural or constructed wetland can achieve.

Cutting sections of the track out to allow for walking paths makes circulation much more efficient. The large track form can be filled with functional and ornamental plants to help integrate it into the landscape as a sculptural memento of the 2010 Winter Olympics.
Whistler has a possible temperature range of 32°C (57°F). The lowest record temperature is -8°C (18°F) in December/January and the highest record temperature is 24°C (75°F) in July/August. This is a relatively mild climate without excessive heat or cold. No extreme conditions need to be taken into account. As far as temperature is concerned, this gives a relatively great amount of freedom when it comes to choosing wall types, insulation thicknesses, structural systems and exterior materials.

The temperature graph on the left shows monthly extremes and averages, but doesn’t convey the temperature swings that can occur in the frame of a 24 hour period. In Whistler’s mountain environment, cold mornings can easily become very warm evenings. Like most coastal cities, the locals are used to saying ‘If you don’t like the weather... wait five minutes.’

Heating, ventilation and air conditioning (HVAC) units must be incredibly efficient and versatile in this kind of environment since the need for heating and/or cooling is present year round.

A fitness facility needs to be kept between 18°C - 22°C (68°F - 72°F) to ensure that participants won’t overheat during exercise and won’t be chilled after exercise (Sawyer, 1999, p. 253).

Employing passive systems that stabilize the interior environment would help keep energy consumption to a minimum.

Norbert Lechner, in his book “Heating, Cooling, Lighting: Sustainable Design Methods for Architects” places the West Coast of North America (which includes Whistler, BC) in climate region 6, an area that has a large variation of microclimates. Lechner remarks that the frequently overcast skies can still provide a suitable amount of solar energy due to the mildness in the temperature. He lists three climatic design priorities:

1st: Keep the heat in and the cold temperatures out during the winter. (I)
2nd: Let the winter sun in (mostly diffused sun because of the clouds). (III)
3rd: Protect from the cold winter winds. (II) (Lechner, 2009, p.98)

Lechner suggests a few design strategies to achieve his climactic design priorities:

- Use Earth sheltering in the form of underground or bermed structures.
- Use evergreen vegetation to create windbreaks.
- Use long sloping roofs, as in the New England saltbox houses, to deflect the wind over the building and to create sheltered zones on the sunny side.
- Use South facing clerestories or dormers instead of skylights (Lechner, 2009, pp.122-133)
The mild climate of the BC coast means plenty of overcast skies, rainy falls and springs, and ample snow in the higher elevations. This presents three main issues: One, potentially destructive moisture penetration; Two, Weight of snow on the building’s roof; and Three, managing large volumes of water that fall onto and run down the building and the site.

Moisture penetration occurs through kinetic energy, surface tension, gravity, capillary action and pressure differential (Bassler [Ed.], 2008, p.82).

Preventing moisture from entering the building is best accomplished with a rain screen-type wall assembly. The rain screen refers to a shell of material that is separated from the main mass of the wall by an airgap.

Managing the snow load means designing appropriately sized structural members to handle the extra weight. A structural engineer would best solve this issue, but sizing members based on simplified calculations would help create the interior spaces of the building.

Water will always flow downhill, and when it can’t, it will pool. Designing proper draining and site topography is essential to keep a building from flooding. Utilizing ponds, bioswales and rain gardens is an aesthetically pleasing way to manage rain water.

Annual Total Precipitation: 1215 mm

Snow Load: 160 psf

Annular Total Precipitation: 1215 mm
Moisture Index: 0.99
Snow Load: 160 psf

Precipitation Analysis

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Water will always flow downhill, and when it can’t, it will pool. Designing proper draining and site topography is essential to keep a building from flooding. Utilizing ponds, bioswales and rain gardens is an aesthetically pleasing way to manage rain water.
Though Whistler sits in the heart of the Coast Mountains, the Pacific Coast shoreline is 90 km away. The tall mountains that lie between practically nullify the prevailing Westerlies common to this latitude of coast. Any wind that does make it over Whistler mountain into the Fitzsimmons valley would be turbulent due to the mountain wave effect. Instead, the wind’s behaviour primarily follows a pattern common to valleys. When the valley’s sloped surfaces become cooler than the adjacent air (heat loss due to radiation), the adjacent air that comes into contact with the mountain is also cooled as a result and this cooler, denser air travels down the slope creating katabatic wind, which increase the likelihood of moisture infiltrating a building or snow building up on non-horizontal surfaces.

The average wind velocity in Whistler is around 4 km/hr (expressed as the small light blue circle in the center of the graph). Occasionally, weather phenomenon cause this number to rise dramatically. The dark blue line represents record high speeds and their prevailing direction. Though these speeds are uncommon, they are possible, and any built structure must be able to withstand them. It is also worth mentioning that these winds may be coupled with rain or snow, which increase the likelihood of moisture infiltrating a building or snow building up on non-horizontal surfaces.

![Wind Graph](image)

**Figure 89 - Annual wind graph for Whistler, BC**

**Figure 90 - Anabatic wind diagram**

**Figure 91 - Katabatic Wind diagram**

which is also called mountain breeze. The opposite effect happens when the valley surfaces become warmer than the adjacent air (heat gain from solar radiation). The air that comes into contact with the warmer surface is also warmed. This lighter, less dense air travels up the mountain side and is called anabatic wind, or valley breeze. It is important to note that during the summer months, anabatic wind will be present during the warming hours (day) and katabatic wind will be present during the cooling hours (night). During the winter months, the lack of solar radiation in addition to the presence of snow make the cooler katabatic winds the only type of wind. (Pepper, 2000)
Site Analysis

Solar Analysis

The Whistler Sliding Centre sits near the lowest point of a valley on a North facing slope surrounded by tall coniferous trees. Needless to say, the amount of direct sunlight that falls on the site is minimal. The frequently overcast skies further limit access to direct solar energy.

Photovoltaics on this site would only generate minimal amounts of electricity; far too little to offset their cost and are therefore not a viable source of energy. Storing available solar energy into heatsinks to stabilize an interior environment would be a much better strategy to harness sunlight.

A building design and a site design that takes full advantage of what little sunlight is available is important. Especially in a facility that is meant to embody the spirit of nature and environmental responsibility. Also, the quality of indoor and outdoor spaces is directly related to the amount of natural light. Allowing sunlight to be the major source of light in a space helps accomplish this. Utilizing light sensors connected to artificial lights in order to provide the required 75 - 100 foot candles in all exercise spaces would be a good way to do this. (Sawyer, 1999, p.253)
Shadow Analysis

The following graphic demonstrates the extreme and the median amount of light that falls on the Whistler Sliding Centre site in a qualitative way. The extreme examples, being the Solstices at 1:30pm (When the sun is closest to, and farthest from the location) indicate extreme shadow and some shadow respectively. Even on the warmest summer day, shadows will fall due to the Northern latitude and north facing slope.

Biogeoclimatic Analysis

Whistler, BC is part of the ‘Coastal Western Hemlock’ Biogeoclimatic Zone. The Coastal Western Hemlock Zone is identified by its temperate rainforests, which can be found in abundance in Whistler. Temperate rainforests are vast and complex ecosystems. This makes them fairly resilient to human interference, but not invincible.

Whistler is covered primarily in Western hemlock and Western redcedar. Other species include Amabilis fir, yellow-cedar, Douglas fir, Grand fir, Western white pine and bigleaf maple.

The Coastal Western Hemlock Zone is the most diverse zone in British Columbia because it encompasses so many types of ecosystems. Coast lines, wetlands and mountainous forests are all part of this Zone. Whistler is predominantly upland forest, though it used to have a healthy wetland system before Whistler village began to expand on the valley floor. Ensuring that all water that leaves the site of Thunderbird Centre Resort is near-potable would greatly lessen the burden of what wetlands remain.

In Whistler, the soils are thick with organic matter, but nutrients are quickly swept away by the wet climate. Consequently, deep foundation systems must be utilized to achieve stability in the viscous soil, which is susceptible to erosion and sedimentation, especially on the sloped surface. (Egan, 1999)
Programmatic Requirements
### Programmatic Requirements

#### Resort Program

1. **Resort spaces**
   - Welcome Centre + Reception + Olympic Museum
   - Event Auditorium
   - Resident’s Hot House
   - Backcountry Adventure Centre
   - New Functions
     - Road & Infrastructure improvements
     - Duplex & Quadraplex Units
     - Private Lots
     - Youth Hostel
     - Public Parks
     - Walk/Bike Trails
     - Ornamentally Planted Sliding Track
     - Children’s Accessible Playground
     - Fitness Centre

2. **Resort Operations + Maintenance**
   - Backcountry Adventure Centre

#### Building Program

1. **Support**
   - Men’s Main Locker Room: 3000 sf
   - Women’s Main Locker Room: 3000 sf
   - Public Washroom: 2500 sf
   - Vestibule: 300 sf
   - Entrance/Atrium: 300 sf
   - Reception + Check-in: 300 sf
   - Circulation (15%): 3000 sf
   - Men’s Main Locker Room: 3000 sf
   - Women’s Main Locker Room: 3000 sf
   - Public Washroom: 2500 sf
   - Vestibule: 300 sf
   - Entrance/Atrium: 3000 sf

#### Fitness Centre Spaces

<table>
<thead>
<tr>
<th>Area</th>
<th>SF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vestibule</td>
<td>300 sf</td>
</tr>
<tr>
<td>Entrance/Atrium</td>
<td>300 sf</td>
</tr>
<tr>
<td>Reception + Check-in</td>
<td>300 sf</td>
</tr>
<tr>
<td>Circulation (15%)</td>
<td>3000 sf</td>
</tr>
<tr>
<td>Men’s Main Locker Room</td>
<td>3000 sf</td>
</tr>
<tr>
<td>Women’s Main Locker Room</td>
<td>3000 sf</td>
</tr>
<tr>
<td>Public Washroom</td>
<td>2500 sf</td>
</tr>
<tr>
<td>Vestibule</td>
<td>300 sf</td>
</tr>
<tr>
<td>Entrance/Atrium</td>
<td>3000 sf</td>
</tr>
</tbody>
</table>

#### Fitness Centre Spaces - Administration

<table>
<thead>
<tr>
<th>Area</th>
<th>SF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director’s Office</td>
<td>150 sf</td>
</tr>
<tr>
<td>Administration Offices (2)</td>
<td>250 sf</td>
</tr>
<tr>
<td>Conference Room</td>
<td>350 sf</td>
</tr>
<tr>
<td>Work Room (3 workstations)</td>
<td>250 sf</td>
</tr>
</tbody>
</table>

#### Fitness Centre Spaces - Service

<table>
<thead>
<tr>
<th>Area</th>
<th>SF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Exercise/Dance Studio Storage</td>
<td>500 sf</td>
</tr>
<tr>
<td>Laundry Service</td>
<td>600 sf</td>
</tr>
<tr>
<td>Equipment Storage</td>
<td>600 sf</td>
</tr>
<tr>
<td>Facility Storage</td>
<td>600 sf</td>
</tr>
<tr>
<td>Cardiovascular Exercise</td>
<td>600 sf</td>
</tr>
</tbody>
</table>

#### Fitness Centre Spaces - Exercise

<table>
<thead>
<tr>
<th>Area</th>
<th>SF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy Weight Strength Training</td>
<td>2000 sf</td>
</tr>
<tr>
<td>Light Weight Strength Training</td>
<td>2000 sf</td>
</tr>
<tr>
<td>Cardiovascular Exercise</td>
<td>2500 sf</td>
</tr>
<tr>
<td>Rock Climbing</td>
<td>4000 sf</td>
</tr>
<tr>
<td>Group Exercise/Dance Studio</td>
<td>2500 sf</td>
</tr>
<tr>
<td>Personal Training Studio</td>
<td>830 sf</td>
</tr>
</tbody>
</table>

### TOTAL

<table>
<thead>
<tr>
<th>Area</th>
<th>SF</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL</td>
<td>60,000 sf</td>
</tr>
</tbody>
</table>

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**Figure 98 - Photo of Whistler Sliding Centre Entrance**
Design Process

Figure 101 - Photo of the results of Production week
I love Whistler and the incredibly beautiful land it occupies. In the summer before the thesis project was to start, I made six dedicated trips into Whistler, exploring the city, the mountains and the backcountry. On these excursions, I identified three potential project sites. This photograph shows my descent down the East side of Whistler Mountain with Site #2 covered in lingering snow below. None of them included the bobsled track. Each was mapped, photographed and analyzed. School started, and research into the project began. Through research, I realized that building on such virgin land was irresponsible. So, I began to look for opportunities with a similar natural environment but with existing construction that needed transformation.

Right before returning to North Dakota for the school year, I sat in my kitchen for a few hours and diagrammed the situation in Whistler with respect to the effect the Olympics had on the economy, the population and the environment in general. This was the beginning of a thesis question that would guide a year long process.

Even before arriving at school, I had gathered an incredible amount of resources from Whistler and from online journals. The spread of pages across the top of this image is just a small portion of the journal articles I collected. The Whistler community plan as well as Whistler 2020 (a long term community plan) were important elements that helped define the thesis question.
After pursuing the research pertinent to Whistler and Bobsled tracks, the first step of the design process was to explore the local vernacular of design. Alpine communities of Europe act as inspiration for most aesthetic decisions. The trees, the switch backs of the roads and the quality of cabins create a very unique atmosphere.

Determining patterns of traffic through my site and arranging them around a building was necessary to help inform the shape of the building. Because the traffic flow included skiers and snowboarders, the paths had to be largely uninterrupted. The above drawing shows how this particular part of the site acts as a node of many traffic types. At first this appeared to be an asset, but it was more like designing on top of a busy highway intersection.

Above is a small section of the topography of the top of the site. It was used to explore the slope and the quality of the surrounding land. A small plateau had already been cleared of trees in order to building the Men’s Start House of the bobsled track. With the best views of Whistler Village in the valley below, this appeared to be the best location for a building.

The very first attempt at organizing the program elements resulted in a seemingly manageable project. Shown above is a spatial organization diagram showing how the spaces relate to each other vertically.

The third oil-clay model had an expanded lower section, which exposed more of the surface area to the sun, however the need for stacking hotel room floors efficiently demanded that the rectangular prism form remain. The complex program was starting to make building form a nightmare to coordinate with a smart orientation and other passive systems.

This project began as “Thunderbird Lodge”, which was to be a large hotel complex, complete with underground parking, conference center, public cafeteria for skiers, fitness facility and hospitality. The oil-clay model above was an exercise in building form. While its additive form was articulative like many other buildings in Whistler, it appeared too modern and would have not fit as a single building on a mountain.

The third oil-clay model had an expanded lower section, which exposed more of the surface area to the sun, however the need for stacking hotel room floors efficiently demanded that the rectangular prism form remain. The complex program was starting to make building form a nightmare to coordinate with a smart orientation and other passive systems.

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With my focus still on building Thunderbird Lodge at the top of the property (The Southern tip), I began to explore opportunities for the rest of the site. This map outlines roads (dark blue), the sliding track (green), and a ski run (yellow). The existing buildings (red) needed to transform into community assets.

Returning to the building form, a more organic shape that integrated better with the land was encouraged by classmates and my adviser. This plan exercise took advantage of the two sharp slopes with two buildings wings and the main atrium between them. The buildings wings began to represent literal wings of the Thunderbird that informs this project. The literal representation lacked maturity and elegance.

The form evolved into a single winged building that terraced down the South side in order to capitalize on the solar exposure. A constructed ramp bisected the building allowing skiers to pass through without being interrupted or interrupting other paths of movement. The cafeteria had vehicle, pedestrian and skier access as well as excellent views of Whistler valley. While this form worked, the sheer size of the project on the site was overwhelming.

In an effort to capitalize on the views, the height and location remained. Having invested so much time into this particular location and program, I was reluctant to make large changes, however, frustrations grew as I was trying to force a building to be something that wasn’t going to work. I needed new solutions or a change.

Figure 112 - Process photo - Site inventory map
Figure 113 - Process photo - Early form sketch
Figure 114 - Process photo - Initial Oil clay and topography model
Figure 115 - Process photo - Iterations of form
After making no progress on the large hotel at the top of the site, I decided to change locations. With the intent of better interacting with the bobsled track, I chose the narrow section of land between two parts of the track. I also continued to identify public and private areas of the developing master plan.

New floor plans proposed a new building typology in the new site. The typology did away with the hotel part of the original program but retained all the public amenities such as the cafeteria, fitness facilities and conference spaces. Above is the lower floor plan which includes parking, ski storage and mechanical spaces.

The second floor arranges a grand front entrance, circulation, public bathrooms and indoor pool. The complexity of the structure and the many sharp corners make this design a poor solution to the program extracted from the thesis question.

The form fit well within the site, but it was still too large and failed to gather an appropriate program into a comprehensive organization.
After mid-term presentations, I decided to once again change my typology and site location to something that would better address the question I had posed earlier in the thesis process. The implied circle created by turn #16, called thunderbird, at the bottom of the track was chosen since the circle has a strong connection to the five rings of the Olympic symbol. From this point on, rings and circles became an important element of the design.

The sliding track, which plays a central role in this project needed to be addressed. The concept of turning it into a decorative garden element and linear wetland was conceived. Eventually, the wetland concept would be replaced with a bioswale, which can function better with running water, where a wetland works best with still or slow moving water.

The typology had been changed from mega-hotel, to community ski lodge, to fitness centre. Each decision significantly reduced the scale of the project, which allowed for greater detail to be explored, especially since the project was beginning to take on two aspects: the Master plan and the building. From this point on, those two areas would be developed to work together in order to address the thesis question.

Organizing the building masses with respect to the site and the bobsled track was done with the intent to convey a sense of pride in the bobsled track and the symbols of the Olympics.

Settling on a final form that facilitated the program, spatial organization as well as the broader master plan was finally reached. A low sloping roof form that took advantage of Southern solar exposure, while rising in height on the North side to create expansive views was found to be the best solution. It solved all the orientation issues of the first two typologies.

Design Process

Figure 120 - Process photo- comprehensive master plan exploration
Figure 121 - Process photo- Form explorations, Design #3
Figure 122 - Process photo- Bobble track opportunities
Figure 123 - Process photo- Design #3 space planning
Figure 124 - Process photo- Design #3 Form exploration
Figure 125 - Process photo- Plan and site exploration
Composition of the exterior began once the spaces had been defined.

Floor plans that established the program spaces were developed.

In section, I explored passive systems and the use of the rock climbing wall as a heat sink in order to passively heat the building during the cold nights.

In order to coordinate the complicated structure, I developed an autoCAD 3D model that established the heights and dimensions of all structural members. It is through this model that I explored the structural system.
I started to build the structure in Revit 2013 using the previously developed AutoCAD model as a reference. The arched glulam beams shown in the screenshot above were replaced with a more sensible system of beams and girders.

Integrating the building with the topography allowed the cold winds moving down the mountain slope to pass up and over the building with little turbulence and almost no lateral forces. The warmer winds traveling up the mountain slope were captured like a wind scoop so that they could pass through the building, cooling it passively in the summer time.

Final exterior composition was finalized. The large percentage of North Wall is operable glazing, allowing for unobstructed views and the ability for natural winds to pass through the building.

The Revit model was complete. It was time for the final presentation!
Project Solution

Thunderbird Centre Resort responds to this imminent burden by proposing a financially viable transformation that can reverse the financial deficit, add value and encourage a diverse community. Currently, the community must support the rarely-used facility annually. With the Olympic legacy fund running at a cost of over two million dollars, Thunderbird Centre Resort, Resort Development and Fitness Facility, 61,000 sq.ft. is the bobsled, luge and skeleton track used for competition, infrastructure and fierce nationalism to Western Canada. But, after their Olympics have come to a close, the Olympic Sliding events. Transforming the Men’s and Women’s Bobsled Start Houses into a Backcountry Adventure Centre that outfits local communities were left after the closing ceremonies, the Backcountry. A proud legacy. Filled and strategically planted, the long trough acts as a bioswale, filtering water run-off before returning it to Fitzsimmons Creek. A functional and sculptural sliding track, and an accessible playground open to people of all abilities. The presence of new amenities perpetuate the positive impact of the 2010 Winter Olympics.

The 2010 Winter Olympics brought athletic competition, infrastructure and fierce nationalism to Western Canada. But, after their Olympics have come to a close, the Olympic Sliding events. Transforming the Men’s and Women’s Bobsled Start Houses into a Backcountry Adventure Centre that outfits local communities were left after the closing ceremonies, the Backcountry. A proud legacy. Filled and strategically planted, the long trough acts as a bioswale, filtering water run-off before returning it to Fitzsimmons Creek. A functional and sculptural sliding track, and an accessible playground open to people of all abilities. The presence of new amenities perpetuate the positive impact of the 2010 Winter Olympics.
How can Architecture transform Obsolete Sporting facilities into community assets in a post olympic environment?
Project Solution

Figure 144 - Presentation slide 9
Figure 145 - Presentation slide 10
Figure 146 - Presentation slide 11
Figure 147 - Presentation slide 12
How can architecture transform obsolete sporting facilities into community assets in a post Olympic environment?

Thank you!

Questions and Comments?
Figure 172 - Photo of Peak to Peak Gondola Connecting Whistler and Blackcomb
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Hometown: Abbotsford, British Columbia, Canada.
Permanent Address:
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2110 Bradner Road
Abbotsford, BC
CANADA
V4X 1C3

NDSU’s comprehensive architecture program has prepared me for a successful career in Architecture
-Dustin Peter Froese
References


Froese, Dustin. (2012) *All photographs unless otherwise credited are the sole property of the author*


Froese, Dustin. (2011) *All photographs unless otherwise credited are the sole property of the author*
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Starks, Tim (Photographer). Date picture taken. “Photograph of Sarajevo Bobsled Track.” Retrieved from www.darkoptics.net


Figure 177 - Panorama Photo of Whistler Valley