

### **3.5 Land Use**

Information regarding historical and current land use was gathered through interviews with Parks Canada staff, a desktop information review, archival searches, aerial photograph interpretation and site visits.

#### **3.5.1 Historical Land Use**

##### **Existing recreation centre**

The sand dune located east of the existing recreation centre (Figure 7) is of archaeological significance and is a recorded archaeological site with evidence of human use extending back 8,000 years. Arrowheads and points have been retrieved from the dune. The value of the site is in its stratification and the site is fragile. The dune was impacted significantly in the 1970's when material was removed for a playground in Banff. If the dune was to be further impacted during the construction of the multiplex a complete mitigative investigation would need to be completed (Langemann, pers.comm. 2007).

There is photographic evidence of a farm or similar operation, consisting of approximately 8 buildings and a fenced pen being located at the site of the existing recreation centre during the 1920's (Appendix B - Air Photos: Existing Recreation Centre Site - 1920). Previous reporting states that this site was a dairy operation, owned by the Brewster family, that functioned from 1890 to 1928 and that the potential exists for buried waste to be present (EBA, 2007a). These structures appear to have been removed by 1949 (Appendix B - Existing Recreation Centre Site - 1949).

There were two septic fields formerly located at the site. One former septic field site is beneath the site of the existing hockey arena and operated from approximately 1961 to 1967. The other former septic field site is located northeast of the curling rink, approximately where the outdoor ice surface clearing is located. Decommissioning of these septic fields could not be verified (EBA, 2007a).

The 1978 air photo (Appendix B - Existing Recreation Centre Site - 1978) shows the existing recreation centre buildings and establishment of the associated power line ROWs. This air photo shows a storage area on the CP lands, east-southeast of the recreation centre, that contains buildings and possibly bulk fluids storage containers. This area of the CP lands had three areas of dark staining that may indicate fluid spills.

The 1994 air photo (Appendix B - Existing Recreation Centre Site - 1994) shows that the tennis courts had been built and that the CP storage area had been extended north and west to the edge of the CP property line. Visual evidence of potentially stained areas is unavailable due to the exposure of the photograph. There appear to be no major changes to the recreation centre buildings.

The only apparent change between the 1994 and 2003 air photos is that all but two structures have been removed from the CP lands to the southwest of the recreation centre (Appendix B - Existing Recreation Centre Site - 2003). One of these structures is a building and the other is unidentifiable.

Aside from the sand dune, there appears to be no other significant evidence of historical land use currently existing on the site.

### **Elkwoods**

As per the 1949 air photo (Appendix B – Elkwoods Site - 1949), the Elkwoods site appeared to be mainly forested land bordered by the railway tracks to the northwest and Banff Avenue to the southeast. The northeast and southwest borders were forest. One significant historical land use of the Elkwoods site prior to 1949 was the clearing of two ROWs. These two ROWs are still apparent at the site and one is the alignment for the water main and utility poles while the other is abandoned and has an established trail for pedestrian, cycling and equestrian use.

The 1978 air photo (Appendix B – Elkwoods Site - 1978) shows the establishment of Compound Road at the northeast end of the site and the establishment of Marmot Crescent, Marmot Place and the associated housing and commercial developments at the southwest end of the site. There appears to be no significant change to the remainder of the site.

The 1986 and 1994 air photos (Appendix B – Elkwoods Site – 1986 & 1994) show no significant change to the Elkwoods site or lands immediately adjacent.

A domestic refuse dumpsite was uncovered during excavation on the water main ROW that bisects the Elkwoods site from north to south. This dumpsite was subsequently covered over to protect it from scavenging and is of little archaeological interest (Langemann, pers.comm. 2007).

## **3.5.2 Human Use**

### **Existing recreation centre**

The site is bordered to the south by CP Rail lands that contain a multi-track siding, assorted buildings, a train station and outdoor storage areas. The site is bordered to the west by Mount Norquay Road, a paved two lane road that is one of three access points from the TransCanada Highway into Banff. The north and east boundaries of the site are forested land.

On the CP Rail lands there are several monitoring wells (Photo 27). Data from the groundwater has been collected from these monitoring wells for a number of years. From past land use on the CP Rail site, such as fuel tank storage by Imperial Oil, there is potential for contamination on the site (EBA 2007a). Information regarding the monitoring data and the length of time the monitoring wells have been in place is unavailable. CP Rail will not provide any relevant environmental data due to a potential transaction between Parks Canada and CP Rail (Ahmed Ezzat, CP Rail Environmental Staff Consultant, pers. comm. 2007).



Photo 27 – Monitoring well on CP Rail site at the existing recreation centre site.



Photo 28 – Sand dune at the existing recreation centre site.

There is a utility line ROW located approximately 60 m northwest of the south boundary of the site that is oriented southwest-northeast. This ROW parallels the train tracks from the east edge of the site for approximately 300 metres before turning away from the tracks towards the sand dune east of the existing recreation centre (photo 28). The ROW is approximately 15 metres wide, has been cleared of trees and does not receive heavy pedestrian, equestrian or bicycle use as evidenced by the lack of distinct trails in this area. The ROW contains utility poles and electrical distribution lines that service the recreation centre and CP Rail facilities.

There is a utility line ROW that extends southeast from the north corner of the recreation centre, across the length of the sand dune and then over the CP Rail lands. This ROW is approximately 20 metres wide from the north corner of the recreation centre to the sand dune where it narrows down to approximately 10 metres wide. The ROW has been cleared of trees and does not receive heavy pedestrian, equestrian or bicycle use as evidenced by the lack of distinct trails in this area. This ROW contains utility poles, electrical distribution lines, buried phone lines and monitoring wells.

The existing recreation centre is located in the southwest end of the site and occupies a footprint of approximately 11,000 m<sup>2</sup> (EBA, 2007). Within the footprint is a building, built in 1961 and further developed in 1968 that contains a full size ice hockey rink as well as a junior rink and four curling rinks. There are viewing galleries, a lounge with a seating capacity of 165, change rooms, and supporting mechanical services for the maintenance of the ice surfaces within the building. Within the exterior footprint of the complex there are three parking areas; a skateboard park that covers the previous tennis courts (Photo 29); a storage shed; maintenance shed and associated works yard with equipment and building supplies and a cleared area to be used as an ice skating surface for the winter of 2007/2008. The access road to this facility is from Mount Norquay Road.



Photo 29 – Skatepark and recreation centre.

There is a cleared ROW that extends from the hockey arena, parallel to Mt. Norquay Road, to the edge of the CP Rail lands. This ROW is for the municipal sewer line and has a sewage lift station at the end where it intersects the recreation centre parking lot (photo 30).



Photo 30 – Sewage lift station at the existing recreation centre site.

There is no evidence of significant human land use at this site outside the disturbed footprints discussed above. There was a mountain bike terrain park built in the trees to the northeast of the existing recreation centre. Once it was discovered by the Town of Banff the people who built it were required to dismantle it (Mary Brewster, Town of Banff, pers. comm. 2007).

### **Elkwoods**

The site is bordered to the northwest by the CP Rail ROW that contains a pedestrian/cycling trail and a single set of tracks (photo 31) and to the northeast by Compound Rd. The southeast boundary of the site is defined by Banff Avenue and the southwest boundary by the residences and businesses on the northeast side of Marmot Crescent.

There are two utility line ROW's on the site; one is oriented southwest-northeast (ROW 1) and the other is oriented northwest-southeast (ROW 2).



Photo 31 – Pedestrian/cycling trail and single set of railway tracks at Elkwoods site.

ROW 1 is approximately 5 m wide, has small trees on it and utility poles carrying electrical distribution lines that extend from the southwest edge of the site to the intersection with ROW 2 (Figure 8). Northeast of the intersection ROW 1 has no poles or lines present. ROW 1 has an established trail present that is obviously used by pedestrian, equestrian and bicycle traffic. ROW 2 carries utility poles and electrical distribution lines from the ROW intersection northwest to the CP Rail ROW. This ROW is not as heavily trafficked as ROW 1 as evidenced by the lack of a distinct trail. There is a water main below the surface of ROW 2 that carries water to the Town of Banff reservoir on Tunnel Mountain.

The portion of the site southwest of ROW 2 has very little evidence of human use. There is one area that has a dam made of wood and tires across an ephemeral channel (photo 32) and a dump of household goods.

The portion of the site to the northeast of ROW 2 shows little evidence of human use. There is a table and a cabinet at one location as well as some bags of garbage but the furniture items do not appear to have been recently utilized.



Photo 32 – Garbage on site, attempt at small dam at Elkwoods site.

### 3.5.3 Level of Demand

In theory the level of demand will be the same for each site. But due to a variety of parameters including visual impact, accessibility, proximity to users, one site might be favored over the other. To thoroughly assess the level of demand would require an assessment of public opinion and is outside of the scope of this project. However, a preliminary review of *The Lands Adjacent to the Town of Banff External Advisory Committee, Final Report* (May 2005) revealed that the objectives of development around the Town of Banff are to maintain or restore ecological integrity, support improvements of recreational opportunities and, direct human use to already popular locations. Improved trail systems and access to already popular areas was discussed at length in the report and supported by over 80% of the public (*Summary of Public Comment*, Parks Canada, 2006). As such, both sites exhibit trail networks (mostly informal) which could be further developed around the proposed multiplex to encourage pedestrian, equestrian and bicycle use.

#### Existing recreation centre

The existing recreation centre site is already being used as a recreation area with parking and infrastructure. With the proposed multiplex there will be an increase in vehicles and human use in the area.

#### Elkwoods

Building the multiplex on the Elkwoods site will cause an increased level of demand and a change in land use. Currently the site is forested and has no human use except pedestrians, equestrians and cyclists.

### 3.5.4 Visual Impact

The potential visual impact of the proposed multiplex development on each site will depend on structure design and area cleared. However, based on the amount of land clearing necessary to construct the multiplex the overall visual impact will be relatively the same for both locations. The only difference would be that the existing recreation centre site has already been visually impacted by the development of the existing site and the visible ‘change’ would be less for this

site. The Elkwoods site is forested; therefore the development would have more of a visual impact due to the change in land use.

Ideally a visual impact analysis would include a digital terrain model of the site with the multiplex building embedded and then running 3D viewscales from different vantage points around the site to determine how the multiplex would fit into the surrounding landscape/urbanscape. This type of analysis would be useful in the next phase of the project - once the multiplex building location has been determined.

## **3.6 Environmental Technology Potential**

### **3.6.1 Geothermal**

Utilizing geothermal energy for heating and cooling structures entails drilling boreholes to determine soil conditions at the proposed site. During the drilling process careful monitoring of the changing soils is critical. Once the down-hole conditions are determined, it may be necessary to perform a soil conductivity test. This test involves the placement of a loop into the borehole, grouting or sealing the pipe into the hole and injecting a prescribed amount of heat through the loop pipe for 72 hours. The temperatures are recorded with the results being sent to an independent engineering firm that specializes in analyzing this data. Once this data is analyzed, the conductivity report will tell how many British thermal units each borehole will provide the system. Once the heating requirements are determined for a building, the size of the loop field can be calculated.

Tree removal would be required to access areas of the site to drill a suitable number of boreholes.

#### **Existing recreation centre**

The existing recreation centre site is currently conducive to installation of a horizontal loop system on the previously cleared land adjacent to the existing facility. Horizontal closed loop installations are generally the most cost-effective for small installations, particularly for new construction where sufficient land area is available. These installations involve burying pipe in trenches dug with back/trackhoes or chain trenchers. Up to six pipes, usually in parallel connections, are buried in each trench, with minimum separations of a foot between pipes and ten to fifteen feet between trenches. The horizontal looping installation could be done on previously cleared areas that could later be used for parking.

#### **Elkwoods**

The Elkwoods site is heavily treed. The geothermal assessment would require cutting several trees. Horizontal closed loop installation would also require clearing to install the loop system. However, as at the existing recreation center, the areas for geothermal testing and horizontal installation could be located in the cleared areas that will eventually be used for the proposed site and parking lot, providing the geothermal potential is adequate in those areas.

### **3.6.2 Solar**

The following table summarizes the predicted insolation at the two potential sites. Note that only the southern edge of the proposed existing recreation centre site was assessed as moving farther north into the proposed site would not impact the solar insolation available.

**Table 7.** Predicted insolation at the two potential sites.

Site location	Average solar insolation (kWh/m <sup>2</sup> /day)	Predicted average solar insolation at site (kWh/m <sup>2</sup> /day)	Percentage of solar insolation available at site	Comments
Elkwoods 1 - NW corner	4.5	4.3	97%	<ol style="list-style-type: none"> <li>1. There is some mid morning shading during the months of November, December and January.</li> <li>2. Placing panels on the multiplex roof will minimize impact.</li> <li>3. Trees were discounted in the late afternoon as trees will not remain on site.</li> </ol>
Elkwoods 2 - SW corner	4.5	3.3	75%	<ol style="list-style-type: none"> <li>1. There is some mid morning shading during the months of November, December and January.</li> <li>2. There is significant tree coverage in this location. Measurement of the line of sight angle to the surrounding mountains was used to assess solar losses. An angle of 20 degrees was observed which indicates minimum solar loss if the trees were removed.</li> <li>3. The solar pathfinder readings for this site are impacted by the extensive trees and hence should not be used as the main input in determining solar insolation. A more likely measurement would be 97% as seen in Elkwoods site 1.</li> </ol>
Elkwoods 3 - NE corner	4.5	3.4	69%	<ol style="list-style-type: none"> <li>1. The NE corner of the Elkwoods site is at the foot of Tunnel mountain and as a result morning sun hours are reduced during the winter months.</li> <li>2. There is significant tree coverage in this location. Measurement of the line of sight angle to the surrounding mountains was used to assess solar losses. An angle of 30 degrees was observed in an easterly direction which would reduce solar access even if the trees were removed.</li> <li>3. November, December, January, and February morning sun hours would be affected eliminating more than 50% of the available sun during those months.</li> </ol>
Elkwoods 4 - SE corner	4.5	3.2	72%	<ol style="list-style-type: none"> <li>1. The solar pathfinder assessment is the lowest percentage at Elkwoods 4. However this is due more to the trees at this location than the mountains.</li> <li>2. The same comments made regarding Elkwoods 3 apply to Elkwoods 4. There is significant solar loss at the eastern edge of the Elkwoods site.</li> </ol>
Existing Rec. Centre 1 - SW corner	4.5	4.3	96%	<ol style="list-style-type: none"> <li>1. Existing recreation centre site 1 has excellent solar access.</li> <li>2. Trees that showed shading late in the day were discounted from the solar pathfinder readings as their impact would be minimal as long as the panels are located at roof level on the complex.</li> </ol>
Existing Rec. Centre 2 - SE corner	4.5	4.4	99%	<ol style="list-style-type: none"> <li>1. The same comments made for existing recreation centre 1 apply to existing recreation centre 2.</li> <li>2. The 3% solar insolation over and above the existing recreation centre 1 site is gained during the early morning hours.</li> </ol>

### **3.6.3 Wind**

The average annual wind speed in Banff is approximately 5 km/hr. The wind speed increases in the colder months (December to February) to an average of 10 km/hr (Underground Weather Network 2007). The wind data for Banff is collected at the Banff Airport site which is located less than 1 km away from both proposed sites (Underground Weather, 2007).

The historical wind data and vegetation on both sites gives no indication of strong, consistent winds on the site. Generally, average annual wind speeds of at least 14.4- 16.2 km/hr are needed for a small wind turbine to produce enough electricity to be cost-effective (S. Clarke, 2003). For a large turbine that could potentially power a commercial facility even higher wind speeds are required. Due to the low average wind speed and lack of consistent wind on either site wind energy is not a recommended option.