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ENVIRONMENT AND WATER RESOURCES

**SUMMARY OF GOLF COURSE EIS REVIEW GROUP:
NOVEMBER 9, 2005 MEETING**

FINAL REPORT

**PREPARED FOR:
TOWN OF CANMORE**

**PREPARED BY:
KOMEX INTERNATIONAL LTD.**

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EXECUTIVE SUMMARY

On November 9, 2005, a meeting was held involving the Town of Canmore, Three Sisters Mountain Village (TSMV), the Alberta Government (Sustainable Resource Development and Community Development), Jacques Whitford, Komex International Ltd., BH Golf Course Design, and Brown and Associates. The purpose of this meeting was to respond to the Town of Canmore Council resolution on the TSMV Golf Course design, namely to avoid and reduce impacts on the adjacent wildlife corridors, and avoid and or minimize wildlife human conflicts. This report is a summary of the information and recommendations presented and discussed at the November 9, 2005 meeting regarding the Three Sisters Golf Course EIS's. Relevant portions of these recommendations were cross-referenced with the omissions and oversights outlined in Komex (2005).

On December 2nd, 2005, TSMV had proposed design changes to the golf course. These changes were to the locations of the clubhouse, parking lot, golf cart staging area, and driving range. The impacts of these proposed changes were discussed by answering two questions provided by the Town of Canmore. Implications as a result of these changes are discussed.

1 INTRODUCTION

Three Sisters Mountain Village Ltd. (TSMV) were required to complete an Environmental Impact Statement (EIS) for two proposed developments: 1) Three Sisters Creek Golf Course Development Permit Area (TSCGR), and 2) the Revised Golf Course Maintenance Facility. These EIS's were prepared in accordance to the Town of Canmore Municipal Development Plan development proposals within or adjacent to Environmentally Sensitive Areas (ESAs). The primary ESAs of concern for these EIS's are wildlife corridors. The TSCGR and Maintenance Facility are located in the southern portion of the Resort Centre Area Structure Plan (see Figure 1-1 in Jacques Whitford 2005a and b). These two EIS's were reviewed and critiqued by Komex International Ltd. (Komex) in September 2005 (Komex 2005).

In response to the omissions and oversights identified by Komex (2005), Council passed a resolution on October 18, 2005. This initiated a collaborative process to investigate design changes and mitigation measures to reduce impacts and increase certainty levels in regard to development of the golf course. The first step in this process was a November 9, 2005 meeting of Town staff, Komex, Provincial representatives, TSMV, and Jacques Whitford.

Komex International Ltd. was then commissioned by the Town of Canmore to prepare a brief letter-report to advise Council on the results and recommendations arising from this meeting in regard to the golf course design. The relevant portions of these recommendations were cross-referenced with the omissions and oversights outlined in Komex (2005). These include:

1. A more thorough review of the local and regional literature;
2. Integration and consideration of the vast amount of data from other studies and unpublished government data that should be analyzed and considered. Data that Jacques Whitford (2005c) had collected is limited, and additional analysis is needed to make definitive conclusions. These data also need to be compared with the aforementioned available data;
3. A retrospective power analysis on the TSMV Wildlife Monitoring Program data, to test for the uncertainty in the findings of this study;
4. Recalculate the slope use by wildlife;
5. Correct the error in the conservation status of grizzly bears;
6. Impact ratings should be revised and revisited (*i.e.*, a high impact should be >10%, not >25%);

7. Confidence ratings (High, Medium and Low) for each impact determination. If these authors have predicted a low impact to wildlife, it should be made clear how confident they are in making this statement; and,
8. Potential impacts should be more species specific, especially for highly sensitive species such as grizzly bears.

The key issues discussed at this meeting include:

1. Golf Course Proposal;
2. Golf Course Design;
3. Operation and Maintenance Activities;
4. Construction Management;
5. Wildlife monitoring programs and analysis of wildlife data; and,
6. Various other issues:
 - Vegetation management;
 - Fencing;
 - Recreation Trails; and,
 - Ongoing discussions.

On December 2nd, 2005, TSMV had proposed design changes to the golf course. These changes were to the locations of the clubhouse, parking lot, golf cart staging area, and driving range. The impacts of these proposed changes were discussed by answering two questions provided by the Town of Canmore.

2 SUMMARY OF KEY ISSUES

2.1 GOLF COURSE PROPOSAL

Gary Browning of BH Golf Design had stated that the proposed Three Sisters Golf Course (TSGC) was designed primarily for golfers, and not for the needs of wildlife. However, this golf course is designed to facilitate, but not encourage, wildlife movement.

2.2 GOLF COURSE DESIGN

2.2.1 NORTH-SOUTH DIVISION OF GOLF COURSE

It was discussed at the meeting that the most effective and practical approach will be to divide the design and operation of the golf course into north and south precincts. This will be achieved by using the golf course cabin line (located in the Resort Centre ASP) as the dividing line. The portion of the golf course south of this line will be subjected to design and operational recommendations as outlined by Golder (2002), Jacques Whitford (2004, 2005a and b), and Komex (2005), as well as in this report. Conversely the portion of the golf course north of this line will be exempt from most of these requirements, as the expected impacts will be minimal.

2.2.2 LOCATION, WIDTH, ORIENTATION, DESIGN OF FAIRWAYS, TEES, AND GREENS

It was suggested that the width of the fairways (clearing) should be minimized in areas adjacent to wildlife corridors. However, this will need to be balanced with the need for adequate sight lines for golfers on the course in order to avoid surprising animals. The planting of unpalatable grasses and other vegetation was discussed, and needs to be explored further by TSMV, the Province (ASRD and Community Development), and the Town Canmore. Golf courses are an attractant for species such as elk, and these fertilized lawns have much higher nitrogen content than native grasses (McKenzie 2001).

2.2.3 WIDTHS AND SELECTIVE CLEARING OF ROUGH

In areas south of the golf course cabin line (see 2.2.1), widths of the roughs and clearing within rough should be minimized. For roughs on the south side of the holes adjacent to the wildlife corridors, these roughs should be re-vegetated after grading. However, it must be recognized that this needs to be “field-fit” as part of ongoing dialogue during golf course construction. These requirements must also be balanced with the need for adequate sight lines for golfers on the course in order to avoid surprising animals (see 2.2.2).

The growth of buffalo berry (*Sherperdia canadensis*) in thinned and cleared areas is a major issue for ongoing management (Golder 2002, Jacques Whitford 2005a). As per Golder (2002) and Jacques Whitford (2004), the control and removal of buffalo berry is necessary.

2.2.4 LOCATION AND DESIGN OF CART PATHS AND IN-COURSE FACILITIES (PUMPHOUSES AND WASHROOMS)

The layout of these cart paths and in-course facilities (pumphouses and washrooms) have been done in a way to minimize the proximity to wildlife corridors.

2.2.5 DESIGN AND LOCATION OF MAINTENANCE COMPOUND

It was discussed that the location of the maintenance compound west of Hole #8 is acceptable at the proposed distance from the wildlife corridor. Komex (2005) stated that this location of the maintenance facility is preferred over the location at the end of Three Sisters Boulevard, since the setback from the wildlife corridor buffer is much greater for the location at Hole #8.

2.2.6 DESIGN AND LOCATION OF CLUBHOUSE

It is assumed that the clubhouse will be a year-round facility. It was recommended that the clubhouse be relocated north of Pond #2, and that the parking lot be located to the north of the clubhouse. This will position the golf course within the developed area, north of the golf course cabin line. However, moving this clubhouse may affect the functionality of the golf course. There was some discussion of designing the clubhouse to have most of the activity on the parking side and less on the south side facing the corridor.

The recommendation of moving the golf course northward follows Komex (2005), as well as professional opinion, experience, and relevant scientific literature. The rationale is to try and reduce impacts to the functionality of the wildlife corridor. There is little empirical evidence available on the proximity of human developments and corridor use, especially by sensitive species such as grizzly bear. However, providing a greater distance between human developments and the corridor should reduce impacts to wildlife using the corridor (see Komex (2005) for a discussion).

2.3 OPERATION AND MAINTENANCE ACTIVITIES

2.3.1 HOURS AND SEASONS OF MAINTENANCE

South of the golf cabin line, maintenance will be restricted on Holes No. 8, 9, 10, 11, 12, 14, 15, and 16 with maintenance only take place between one hour after sunrise and one hour before sunset (Golder 2002). There are no restrictions to the remainder of the course to the north. Season was not discussed, and maintenance hours should be restricted in the same manner previously described for the golf season.

2.3.2 HOURS AND SEASONS OF GOLF PLAY

Hours of play should be restricted in the same locations and same hours as described in 2.3.1 above. Season of play was not discussed, but is likely weather-dependent with no definitive minimum starting and end dates.

2.4 CONSTRUCTION MANAGEMENT

2.4.1 SEASONS FOR CLEARING AND GRADING

The most critical times for construction (clearing and grading) in the area are normally February to March. During this period, no construction activity should occur within the south golf course area. Moreover, no clearing or grading should be allowed within the south area from December 1st through to mid-June. However, during this period (with the possible exception of February and March), clearing and grading could occur within the north (high activity) area. Site specific information may determine variations and possible exceptions to these requirements if approved by the Province (ASRD and Community Development) and / or independent biologist.

2.4.2 TIMES FOR CLEARING AND GRADING

All construction activities (includes clearing and grading) within the golf course (in addition to being constrained by Canmore's noise bylaw), shall be limited to one hour after sunrise and one hour before sunset. As with the construction season (2.4.1), exceptions may be granted based on specific locations and conditions subject to the Town's bylaws, as well as recommendations by the Province (ASRD and Community Development) and / or the independent biologist.

2.5 WILDLIFE MONITORING PROGRAMS AND ANALYSIS OF WILDLIFE DATA

2.5.1 ADDITIONAL ANALYSIS OF DATA FROM THE TSMV 2000-2004 WILDLIFE MONITORING PROGRAM AND OTHER RELEVANT AVAILABLE DATA

It was recommended by Komex (2005) that additional analysis of the TSMV wildlife monitoring data be conducted. Specifically it was recommended that a retrospective power analysis be used, to test for the uncertainty in the findings of this study (Komex 2005: 12). It would also be useful for other datasets, such as the grizzly bear telemetry data, to be utilized in predicting and increasing the confidence level of the impacts (Komex 2005: 10-11).

2.5.2 WILDLIFE MONITORING PROGRAMS

The design and requirements for the TSMV wildlife monitoring programs will continue to be a responsibility of TSMV and the Province (ASRD and Community Development). The Province shall provide guidance and expert feedback to TSMV. The Town of Canmore will also continue to be involved for information purposes.

2.6 VARIOUS ISSUES

2.6.1 VEGETATION MANAGEMENT

Some items were briefly discussed:

- Timing in relation to construction and operation;
- The Golder (2002) recommendation that wildlife routes may need to be cleared within portions of the cross-valley corridor; and,
- The Golder (2002) recommendation for the removal of obstacles in designated corridors (*e.g.*, chain link fencing protecting undermining hazard near the Parkway in the cross-valley corridor).

It was also recognized that all of these items are part of the ongoing requirements for a vegetation management plan within the conservation easement areas. It is anticipated that the Plan will be available for the Town's review of the development permit application.

2.6.2 FENCING

Post and rail fencing will be constructed between the golf course and the wildlife corridor to alert people to the existence of the corridor. Exclusionary fencing around the

maintenance compound will be required. Fencing is also proposed at the south end of Three Sisters Boulevard to discourage access by the general public. Maintenance access for the golf course, however, will occur through this area.

Although not discussed, it is assumed that the fencing of tees and greens in the off-season is an acceptable practice as long as fencing does not pose a hazard to wildlife. Coordination with the golf course and Province (ASRD and Community Development) will be required to help minimize the effects on wildlife.

2.6.3 RECREATION TRAILS

The potential impact and need for recreation trails – particularly a “natural” east-west connection – was discussed. It was suggested that that **if** a trail south of the golf course served to focus recreational use and decreased the use of the “pirate trails” within the adjacent wildlife corridor, such a trail could have a positive effect on wildlife movement. This trail would be open only during the golf season. However, a trail such as this one would likely need fencing on the uphill side to discourage use of the wildlife corridor, and require closure of existing trails in the wildlife corridor. Other needs include vegetation removal to reduce likelihood of surprise encounters between people and wildlife, and enforcement of current closures. However, Alberta Community Development Heritage Protection Team Leader and the Regional Wildlife Biologist from ASRD noted that given the terrain and existing pattern of recreation use in the area (*i.e.*, mostly downhill), the likelihood was that such a trail would make enforcement of restrictions within the wildlife corridor much more difficult.

It was suggested that the “south trail” could be tried on an experimental basis, and then reclaimed if monitoring proved it to be a concern. However, it must be noted that such a closure would be difficult to enforce, and would also require an alternative east-west natural trail be available in order to be effective. The caveat is that this would also require a sufficient level of confidence in current wildlife monitoring data to effectively measure impacts.

2.6.4 ONGOING DISCUSSIONS

It was agreed that ongoing discussions between the Town of Canmore, the Province (ASRD and Community Development) and TSMV (including consultants as desired), would be useful as the design and construction of the golf course progresses.

2.7 EXPECTED EFFECTS OF IMPLEMENTING PROPOSED DESIGN CHANGES

2.7.1 DESIGN CHANGES PROPOSED BY TSMV

On December 2nd 2005, TSMV submitted a revised site plan for the golf course as a response to the November 9th 2005 meeting. The changes can be summarized as follows¹:

- Clubhouse moved east of pond #2 from 340 m to 370 m north of wildlife corridor (30 m further away);
- Parking area moved east of clubhouse from 320 m to 380 m north of wildlife corridor (60 m further away);
- Golf cart staging area moved from 340 m to 350 m north of wildlife corridor (10 m further away); and,
- Driving range moved southward from 370 m to 340 m north of wildlife corridor (30 m closer).

2.7.2 EVALUATION OF IMPACTS

Based on the proposed changes from TSMV, answers to the following questions will provide an evaluation of impacts to wildlife:

QUESTION #1:

Do these proposed design and mitigation measures meet the intent of the recommended changes discussed during the November 9th meeting to place “high activity” development north of the golf cabin line?

If not, what specific changes would you recommend?

The proposed design does place high activity development north of the cabin line better than the original proposal from TSMV. The main design features that helps keep high activity north of the cabin line are the revised parking lot and club house locations. The parking lot has been turned away from the wildlife corridor and is facing northwest rather than southeast. This may reduce the potential for disturbance and deter activity directed toward the wildlife corridor. Ideally, it would be best to have these facilities adjacent to Hole #5 in order to help reduce potential disturbance to the wildlife corridor as much as possible (see Question #2). Similarly, it would be advisable to have the golf cart staging

¹ These locations will place both the clubhouse and the parking lot north of the east-west “golf cabin line.” The cart staging and driving range would straddle that line.

area and driving range moved further north of the golf cabin line rather than straddling this line in order to reduce disturbance to the wildlife corridor.

QUESTION #2: Have the proposed design changes (including any design changes recommended by Komex in Question #1 and the December 2nd revisions proposed by TSMV) affected the concerns identified by Komex in the review of the EIS for the golf course?

Specifically, are any of those concerns lessened or eliminated by the changes proposed to the golf course design?

As per Question #1, the most significant design changes are the relocation of the club house and the parking lot. The parking lot has been moved east of the club house, as opposed to immediately south of the club house. The distance that the parking lot has been moved is 320 m to 380 m north of wildlife corridor (60 m further away). Komex (2005: 17-18) recommended that both the club house and golf course be relocated further away from the wildlife corridor, and not to be in the middle of the golf course as this may inhibit movement through the wildlife corridor by sensitive species such as grizzly bear. Grizzly bears are very leery of humans and human disturbance, and will tend to avoid areas of high human use (Mattson *et al.* 1987, Kasworm and Manley 1990).

It would be advisable to place the club house and parking lot adjacent to ole #5 in order to maximize the distance from the wildlife corridor (Komex 2005: 18-19). This will enhance and strengthen the layering effect proposed by Golder (2002: 38). In the current configuration proposed by TSMV, the empirical distance of the golf course from the wildlife corridor buffer has not changed substantially (30 m or 8.8%). However the revised location of the parking lot may reduce disturbance to the wildlife corridor and deter people from venturing onto the golf course and into the wildlife corridor. Overall, this appears to be an improvement from the original design, though maximizing the distance of the club house and parking lot from the wildlife corridor (*e.g.*, adjacent to Hole #5), would be the preferred solution.

Due to the high uncertainty of the impacts of the golf course on wildlife movements, a precautionary approach to golf course design should be strongly considered. As reviewed by Komex (2005: 18), and mentioned earlier, the primary species of concern is the grizzly bear. Grizzly bears use the adjacent wildlife corridor to travel seasonally in and out of the Bow Valley (Donelon 2004). Some of the published literature has indicated empirical distances which grizzly bears tend to avoid human developments, trails, and roads. Mattson *et al.* (1987) found that grizzly bears in Yellowstone National

Park, Wyoming, tended to avoid an area averaging 500 m along roads during summer, and 3 km from roads during fall. They suggested that the avoidance more likely occurred during daylight hours. Similarly, Kasworm and Manley (1990) found that grizzly bears avoided habitat within 914 m of open roads in northwestern Montana, and McLellan and Shackelton (1988) found that grizzly bears used the area ≤ 100 m of roads less than expected in southwest British Columbia. Donelon (2004: 51) stated that human use in wildlife corridors should be reduced during daylight hours, as bears are more likely to be travelling distances that allows them to traverse the length of a wildlife corridor. Therefore, maximizing the distance between human use and developments and key grizzly bear movement and foraging areas should reduce impacts on bears.

It is advised that the clubhouse and parking lot be moved further north than the most recent plan from TSMV. This will increase the distance of human use > 400 m from the wildlife corridor, which will increase confidence and certainty in reducing disturbance to grizzly bears using the wildlife corridor. Having the parking lot slightly behind the clubhouse is preferred, since it will keep people further away from the wildlife corridor, thus reducing disturbance. Golder (2002: 43) recommended that “development should be as compressed as possible,” inferring that infrastructure should be localized rather than having it widely spread over the landscape. Golder (2004, *in lit.*) also stated “when mitigating the effects of development on wildlife corridors, increasing the distance between wildlife corridors and development areas is preferred approach to the “layered” approach if sufficient land is available.” Therefore, moving the clubhouse and parking lot further north will keep all of the high human use areas compressed north. Similarly, moving the golf cart staging area and driving range further north is also preferred to help reduce disturbance to the wildlife corridor.

2.7.3 OMISSIONS AND OVERSIGHTS OF THE EIS

Komex (2005) in their review of the Jacques Whitford (2005a and b) EIS’s had highlighted eight omissions and oversights. These omissions and oversights were reviewed in the context of the proposed changes to the golf course design, and if or how these omissions and oversights might be affected by the design changes.

1. A more thorough review of the local and regional literature.

This should be an ongoing exercise to compile and summarize the local and regional literature. Findings from previous and ongoing studies can be compared with the results from the TSMV wildlife monitoring program. This is important for understanding the scope and significance of the potential project-related impacts. Moreover, it can also be determined if the results from the TSMV program are consistent and comparable to other

studies, and that management and mitigation measures from other studies can be reviewed and applied to current and future TSMV developments.

- 2. Integration and consideration of the vast amount of data from other studies and unpublished government data that should be analyzed and considered. Data that Jacques Whitford (2005c) had collected is limited, and additional analysis is needed to make definitive conclusions. These data also need to be compared with the aforementioned available data.**

The utilization of regional data is important in evaluating and predicting impacts to wildlife. While the current wildlife monitoring program is essential and useful, it is also limited in regard to how much inference can be made ecologically. Utilization of data from other studies will increase the level of confidence in the predictions of the impacts of the TSMV golf course. This may also assist in proposing more mitigations and design measures to help reduce impacts on wildlife. Coordination with Provincial Biologists is required.

- 3. A retrospective power analysis on the TSMV Wildlife Monitoring Program data, to test for the uncertainty in the findings of this study.**

It is strongly recommended that this analysis be conducted. This will help evaluate the confidence in the data from previous years, and aid in refining and strengthening the current monitoring program to help evaluate impacts, pre and post construction. Collaboration with Provincial Biologists will be necessary.

- 4. Recalculate the slope use by wildlife.**

This analysis should be redone using a slope as a continuum rather than a simple, univariate point analysis. Jacques Whitford (2005c) may have incorrectly assessed the use of slopes by wildlife, namely that wildlife used steeper slopes than expected. This is important for the follow-up monitoring (post-development), as a change in slope use by wildlife may occur (avoidance), and this should be accurately measured.

- 5. Correct the error in the conservation status of grizzly bears.**

This is an error that has been identified and corrected in Komex (2005: 5-6) with the most current information.

6. Impact ratings should be revised and revisited (*i.e.*, a high impact should be >10%, not >25%).

It was advised that impact ratings be set at a more conservative rating of 10% rather than 25%. This will affect the significance ratings of the impacts. This is important on a local and regional scale, as it underscores the magnitude of the potential impacts the golf course will have on wildlife and wildlife habitat.

7. Confidence ratings (High, Medium and Low) be provided for each impact determination. If these authors have predicted a low impact to wildlife, it should be made clear how confident they are in making this statement.

These confidence ratings are important, since it indicates how certain the predicted impacts will be. For example if it is predicted that this development will not inhibit grizzly bear movement, how certain is this prediction? This needs to be upfront in the EIS, especially if the confidence in the predictions is low. Moreover, this also justifies the moving of the clubhouse and parking lot further north since the uncertainties of the impacts are high on species such as grizzly bears and wolves. The precautionary principle applies where increasing the distance between human developments and the wildlife corridor, will reduce impacts.

8. Potential impacts should be more species specific, especially for highly sensitive species such as grizzly bear.

It is important to identify impacts to highly sensitive species such as grizzly bear and wolf. These species will be the most affected by this development, and having a more clear understanding of the impacts to these species is critical for managing and mitigating the impacts.

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Any questions concerning the information or its interpretation should be directed to Cliff Nietvelt or Tim Van Egmond.

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