
Lift, Trail and Snowmaking Improvements

Capital Project Proposal



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Introduction

The Gunstock Area Commission developed a Master Plan for Gunstock Mountain Resort in 2001. The plan was revised and updated in 2006. The plan provides a detailed outline of proposed improvements for the resort. Many improvements have been made in conjunction with this plan since its inception.

The 2006 Master Plan recognized that over \$7,000,000 in capital expenditures had been made to improve the facilities at Gunstock from fiscal years ending 2002 through 2006. The most significant project during this time was the addition of a high speed lift to the summit and the revitalization of the Pistol complex, including a new terrain park and night skiing. Those improvements have proven very successful, and the resort is comfortably handling the debt payments from the bonds that funded those improvements. An additional \$272,000 was invested during 2007 and 2008, mostly for grooming equipment, campground utility upgrades and technology improvements.

It should be noted that in addition to accomplishing this capital work Gunstock will have returned \$1,721,800 to the county from its operations, (including \$320,128 in the most recent fiscal year) under the Memorandum of Agreement executed in 2000 and renewed in 2005.

The most recent revision of the Master Plan identified two very important areas in need of improvement:

- Considering the resort's stated goal to be #1 in Learn to Ski and Ride programs in New Hampshire, the beginner complex is woefully inadequate. In fact, the longest lift lines at the resort on busy days are at the Gunshy beginner complex.
- The snowmaking system's capacity is undersized to generate sufficient snow to open enough terrain to be ready for the important Christmas holiday periods in an average year. The resort is using costly, inefficient snowmaking gun technology that should be replaced.

This proposal addresses both these needs.

The master plan stated that "each improvement project or equipment replacement identified in this plan will be evaluated on its own financial merits...factors such as initial cost, return on investment, marketability/market risk, guest and staff safety, and competitive advantage/disadvantage will be weighed and measured carefully for each project element."

The commissioners and management at Gunstock believe this project meets the criteria as stated above. This report will detail each project element, outline the project budget, and offer financial data to demonstrate that the project's payback and ROI are sound.

New Beginner Complex

Existing Conditions

One of the four main goals of Gunstock's master plan is to become "New Hampshire's first choice in learn to ski or ride." Programmatically, Gunstock has received national industry recognition as having one of the finest programs in the country for a resort its size. However, lack of suitable terrain and uphill capacity for beginners hampers the growth of these programs. On busy days, by far the longest lift line, sometimes in excess of 40 minutes, will be found at the Gunshy beginner chairlift. This is not the kind of learning experience that would make Gunstock the first choice in New Hampshire.

The resort has committed nearly \$350,000 over the next two seasons to completely update the inventory of rental skis, boots, and snowboards to a system that will dramatically reduce the amount of time it will take to get through the rental process. Gunstock will also be a partner with Burton snowboards as part of their national "learn to ride" program.

Improving the overall beginner mountain experience is critical to meeting the goals of the master plan.

Currently, the Gunshy pod contains all the learning and novice terrain at Gunstock, with the exception of the Sidearm trail at Pistol, which is rarely used, and the conveyor area, which is suitable for "first timers" only. The total terrain in this pod is 2.4 acres. The pod is serviced by an older model double chairlift, used primarily by the ski school. Given the minimal terrain and the double chairlift, the Gunshy pod can accommodate only 150 skiers at one time.

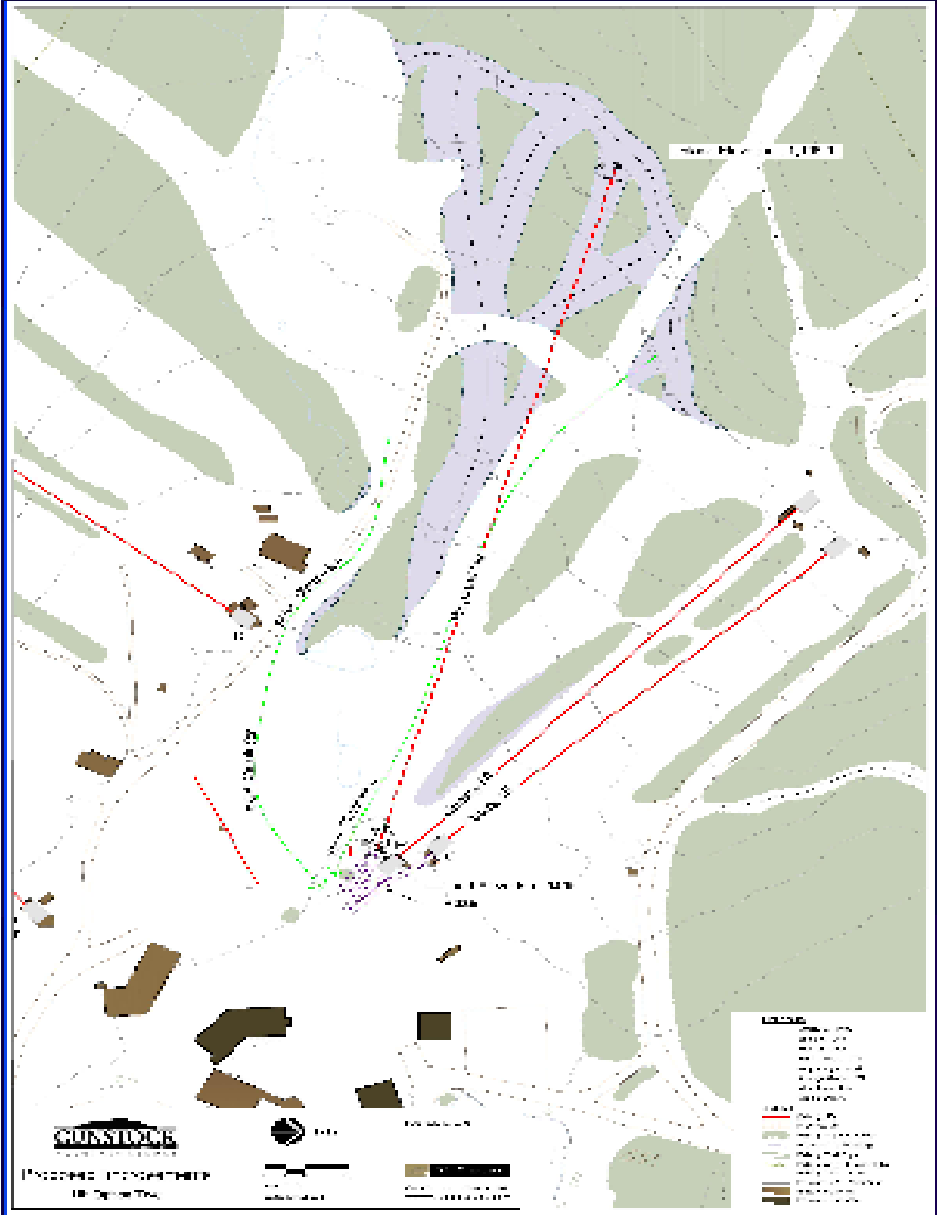
New Beginner Area

As physical constraints do not allow the Gunshy pod to be expanded enough to satisfy the total demand for beginner and novice terrain, it was necessary to fulfill this need elsewhere. As part of the 2005 update to our Master Plan, SE GROUP planners and Gunstock employees completed significant mapping analysis and site cruising before determining that the best potential for new beginner and novice terrain existed between the Gunshy and Tiger pods. This new pod will be established from a low elevation next to the existing Gunshy bottom terminal, to an elevation of nearly 1,100 feet, immediately north of the Stonebar trail.

The pod will be oriented around a 1,231 foot long fixed grip "beginner" quad, the height of which will not exceed 20 feet from the ground and will provide an open, quiet, and non-intimidating experience for beginner and novice skiers and riders. The quad chair will run at slow speeds with a capacity of 1,200 persons per hour.

Three new trails will be accessed from this lift, as well as small feeder trails which will be integrated into the existing terrain. All trails will be designed to a graded slope not to exceed 15%.

The new learning area will be separated from the rest of the mountain with earth, tree barriers, or artificial means. Barriers will allow for a friendly and non-intimidating learning atmosphere for the first-time skiers. A concept map of the proposed improvement is illustrated below.



The improvements to the Gunshy and Beginner Area pods will enable Gunstock to accommodate roughly 460 more skiers at one time, at least tripling the learning terrain capacity. This is a critical first step in establishing Gunstock as a premier learning facility. While still not ideal, the additional beginner and novice terrain will be a welcome addition to the overall mountain experience. Quoting the original recommendation by the SE Group in the first master plan in 2001; ***“Beginner terrain comprises only 0.2 acres. This is very crucial learning terrain for first time visitors, and there is a clear shortage of this type of terrain. This situation needs to be remedied.”***

Classification Breakdown by Ability Level

Ability Level	Existing	Proposed	Ideal
Beginner	<1%	2%	5%
Novice	7%	12%	20%
Intermediate	62%	55%	50%
Advanced	25%	24%	20%
Expert	5%	7%	5%
Totals	100%	100%	100%

Snowmaking Improvements

Existing Conditions

A snowmaking master plan was prepared as part of the overall master plan for the resort in 2001. Many of the suggested improvements contained in that plan have been completed, including:

1. The intake pump system was inadequate for the pumping capacity from the plant to the mountain. The intake pumps were upgraded and a larger pipe was installed to allow more water to be pumped from the pond to the plant.
2. Similarly, the pipes leading from the plant to the first valve station were too small to maximize pump efficiency and allow for future growth. New, larger pipes were installed between the plant and the first valve station.
3. The piping on a large percentage of the mountain was arranged in a way that required water to be pumped all the way over the top using booster pumps. Using the pumps in this manner dropped the capacity of the entire system to 1,600 gallons per minute (GPM) while in this mode. The mountain piping was reconfigured so many of these

trails can be covered without boosting the pressure, resulting in a capacity gain to 3,200 GPM on these trails.

4. Snowmaking pipe was added to the following trails: Blundersmoke, Musket, Tinderbox, Gunpowder, Pistol, Shotgun, and Upper Sidearm. This added nearly 30 acres of additional terrain covered by snowmaking
5. Snowmaking at the beginner Gunshy complex was replaced with new pipe and additional electrical outlets to allow the use of more “fan” gun technology, which is more efficient than the traditional air/water guns they replaced.
6. Several additional “fan” guns and 115 energy efficient “tower” guns have been purchased and are used whenever possible to maximize operating efficiencies.
7. Old, inefficient rotary screw air compressors have been replaced with centrifugal compressors. As a result of these replacements an additional 2,800 CFM of air capacity was added while increasing efficiency.

Proposed Improvements

During the spring of 2008 the snowmaking master plan was revised to reflect improvements which have been completed and to identify future improvements to the system. The purpose of the document was stated to:

1. Update the 2001 snowmaking master plan to evaluate the optimal method of accommodating expansion of terrain given advances in snowmaking technology
2. Determine future capacity requirements given recent on-hill historical records of snowmaking temperatures
3. Review the existing compressor and pumping plant and make recommendations on improvements, including a review of compressor replacement options
4. Evaluate water supply and determine what level of snowmaking pumping capacity can reliably be utilized with the existing intake pumps, transfer piping, and storage
5. Prepare capital cost estimates for expansion given current pricing levels for labor and equipment.

Seven years of weather data were analyzed to determine the average annual hourly temperatures available to make snow. This data was then extrapolated to determine how much water pumping capacity would be needed to cover 80 percent of both existing and proposed terrain in 8 of 10 years by Christmas day.

Unfortunately the data indicates to reach this capacity level would require a full doubling of our existing plant capacity to 8,000 gallons per minute of water and 32,000 CFM of compressed air. An expansion of this magnitude would require a complete rebuild of the entire snowmaking system, including new feed pumps, a new plant, additional building space to house compressors and pumps, etc. However, lowering sites only slightly presents a more optimistic and feasible capacity estimate. An upgrade to overall capacity to 4,500 gallons per minute will allow 80% coverage by 1/15, and an upgrade to 6,000 gallons per minute will cover 80% of existing terrain, and over 60% of any expanded terrain by Christmas day. Both of these scenarios can be achieved by modifying existing

plant and equipment coupled with increased use of energy efficient snow gun technologies, namely fan guns and towers.

The following paragraphs outline the issues currently restricting the capacity of the snowmaking operations and their proposed solutions.

Issue: Insufficient water flow from Cobble Mountain reservoir into snowmaking base pond.

Currently, water is fed from the Cobble Mountain reservoir into the base reservoir (which feeds the snowmaking plant) at a rate of 2,000 gallons per minute (GPM) through an 8 inch steel pipe. This flow rate is insufficient to keep the base reservoir full, particularly during cold weather when capacity is maximized. If the mountain pumping capacity is increased to 4,500 GPM or 6,000 GPM the water supply will be depleted within a short time. In addition, there are two pumps in the pump house, but they are currently configured such that only one at a time may operate.

Solution: Replace pipe with 12 inch and upgrade pumps.

Replacing the 8 inch pipe with 12 inch will increase potential capacity to as much as 6,200 gallons per minute. Reconfiguring the existing pumps to both run together will provide a 4,000 GPM flow, which will be sufficient for the first phase of upgrade. If necessary in the future, the pumps could be replaced with larger capacity units which could boost capacity to the pipe limitation of 6,200 GPM without any further modifications.

Issue: Pumping capacity inside the snowmaking plant will need to be upgraded and re-matched to achieve a 6,000 GPM capacity

Current plant design capacity is 4,500 GPM on the lower mountain and 1,600 GPM on the summit trails. Due to some mismatching of high pressure and low pressure pumps, actual lower mountain capacity is only about 3,600 GPM at this time. An additional booster pump has been purchased and will be installed during the 2008/09 season that will increase upper mountain capacity to nearly 2,000 GPM. Achieving the 6,000 GPM capacity thresholds will require replacement and/or reconfiguration of existing pumps.

Solution: Reconfigure/Replace pumps to operate more efficiently and at higher flow levels

One of two methods will be employed to increase capacity to the 6,000 GPM level. Either pump motors will be resized within the existing plant, or alternatively the booster pumps will be relocated to a base area valve building to boost upper mountain pressure. It is anticipated the capital costs for either method will be similar; further engineering is being conducted to determine which method is a better long term solution.

Issue: The existing process control system is outdated and has several operational issues.

The existing control system computer is very old and not in good working order. The operator graphics have not been updated to reflect changes in the configuration of the plant, which leads to confusion by plant operators and doesn't accurately reflect the configuration of pumps, motors, and control valves. In addition, the software platform is no

longer supported by the manufacturer, and while still functional, may not run properly on newer hardware configurations.

Solution: Upgrade the process control system with new computer hardware and an upgraded process control software solution.

A new computer and software process control monitoring system will be purchased and installed. The software will offer the following features:

- Multi-user, remote web-based capabilities which will allow supervisors and managers to access information remotely either via Gunstock's network or at home via the internet to monitor temperature, flow conditions, and to troubleshoot operation difficulties
- Enhanced reporting capabilities which will provide management reports on plant efficiency and cost of operations. This information will be used to make future operational and capital improvement decisions.
- Ability to integrate into future automation improvements (i.e. automatic remote starting of a string of snow guns)

Issue: Two existing Air Compressors are 23 years old, have obsolete parts and in the future will be very expensive to maintain.

The control systems which operate these units are no longer serviceable. Replacement of the process control systems and repair to their cooling systems are estimated to cost in excess of \$100,000.

Solution: Replace the two compressors with one newer/larger unit.

The two compressors are 700 HP, 3,000 CFM units. They will be replaced with one 1250 HP, 6,000 CFM unit. This will keep the total CFM at 14,000 but will decrease power consumption by 150 HP or 111 Kilowatts. Having one new unit as opposed to 23 year old compressors will decrease annual maintenance costs as well. In the future, the remaining vacant "pad" could be used to add an additional 6,000 CFM unit to bring total air capacity to 20,000 CFM.

Issue: Old Snowmaking Pipe in need of replacement and trails with no snowmaking in need of new snowmaking pipe.

Much of the pipe that supplies compressed air and water to the trails of Gunstock was originally installed in 1985. While most of the piping is in generally good condition, there are specific areas where the combination of soil type, ground water or backfill materials have caused the pipe to rust to the point it is no longer reliable. Also, the configuration of the pipe in the middle section of the lower mountain (the Phelps/Ramrod line) is in very poor condition, and is inefficient and difficult to operate, as individual trails cannot be isolated.

When the Pistol complex was revitalized in 2003, snowmaking was added to the Pistol, Tinderbox, Blundersmoke, and Musket trails, but not to Sidearm and Out of Site. Sidearm is the only "Green Circle" beginner trail in the complex and is very popular when open. Unfortunately, it can only be open when there is sufficient natural snowfall. Similarly, Out

of Site is a very popular traditional New England ski trail that is currently only available on natural snow.

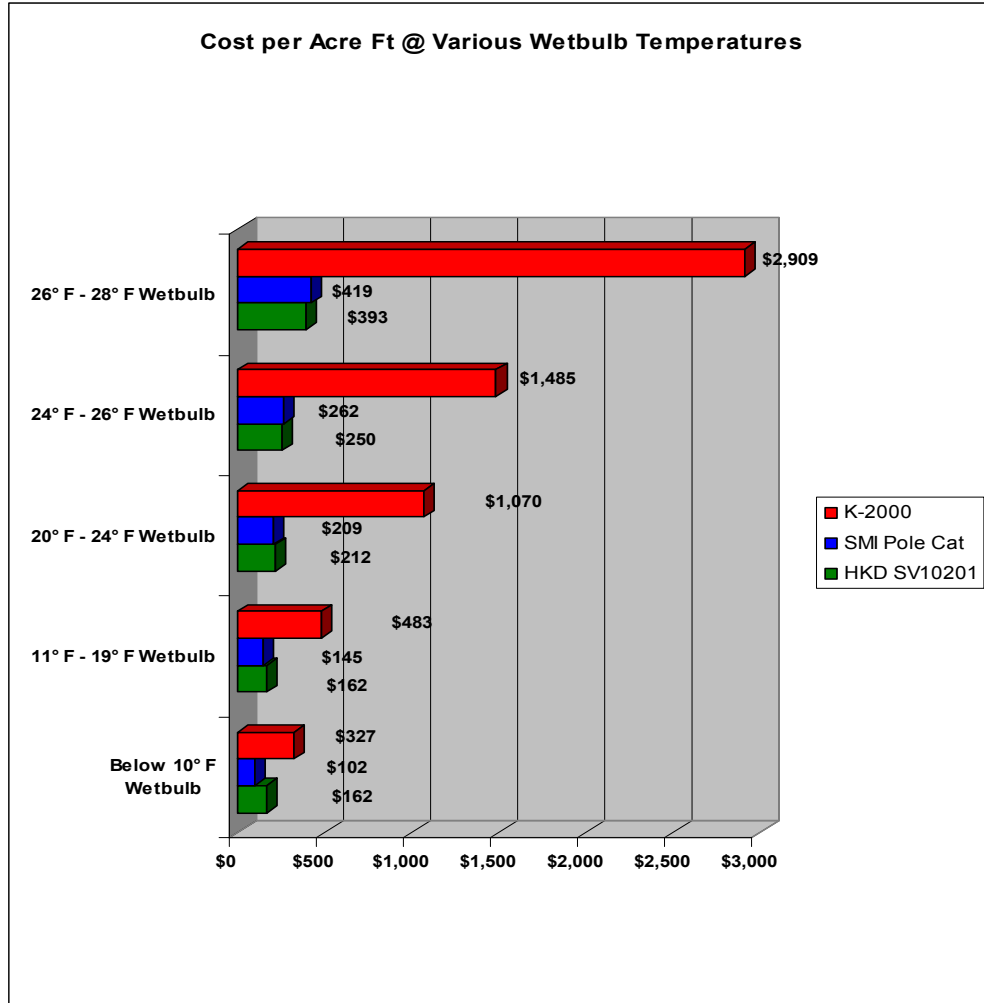
Solution: Replace/Reconfigure and/or install pipe in priority order.

The pipe upgrades listed below are in priority order. The price and/or availability of steel pipe will regulate whether we will be able to complete all planned pipe upgrades. If contingency funds are not needed for other project areas, it could be used to further the network of snowmaking trails.

- 1) Replacement of the “Phelps/Ramrod” line.
- 2) Replacement of the main supply line across the base area from Valve House One to Valve House Two
- 3) Installation of new pipe in the expanded beginner terrain complex
- 4) Installation of new pipe on Sidearm
- 5) Installation of new pipe on Out of Sight
- 6) Installation of new pipe on Hotshot.

Issue: Achieving a 6,000 GPM water capacity without dramatically increasing compressed air capacity will require the purchase of new energy efficient snow guns.

Traditional air water gun technology requires tremendous volumes of compressed air to operate, particularly in warmer snowmaking temperatures. Considering that Gunstock makes over half its snow at temperatures warmer than 24 degrees, this is a significant issue. Newer style “tower” or “stick” guns utilize only about 10% of the air requirement of older guns. Similarly, “fan” guns carry compressors onboard, thereby increasing water capacity without requiring additional fixed air. The chart on the next page illustrates the cost advantages of tower and/or fan technology in terms of dollars spent per acre/foot of snow. (The K-2000 is a traditional air/water, the SMI Pole Cat is a fan gun, and the HKD is a tower.)



Solution: Invest in stick and fan technology as appropriate.

The above chart illustrates the dramatic advantage in operating costs of this new technology at warmer temperatures. Over the course of the 2008/2009 season, we will experiment with varying configurations of tower and fan guns to determine the optimal locations and quantities for each. The initial plan is to purchase 20 additional fan guns and 80 additional towers. This will equip the majority of our high priority, early season trails with faster, more efficient guns. Additionally, an allowance has been made to upgrade the existing electrical infrastructure to accommodate the additional fans.

Project Budget

The overall cost of each project area has been researched and estimated by a combination of Gunstock management, equipment suppliers and vendors, Sno.Matic Engineering company and the S.E. Group. Detailed estimates/quotes have been solicited for major project components such as the chairlift, the snowmaking compressor, snow guns, the process control system, and pumps. Construction estimates and pipe costs were as of May 2008 and were provided by G.W. Tatro, Inc., a leading ski resort

construction company. As previously stated, the cost of steel, transportation, and other materials may affect prices slightly, so a 10% contingency allowance has been allocated to the project to protect against overrun costs of materials. Finally, some areas of the project, particularly snowmaking pipe on new terrain, can be scaled back if necessary without jeopardizing the overall integrity of the project. If contingency funds are available at the end of the project, they will most likely be used to purchase additional guns or add additional pipe where appropriate. The following table outlines each major project area and its associated budget.

Project Area	Budget (\$)
New Beginner Quad Chairlift	750,000
New Beginner Complex Trail Construction	80,000
Increase Cobble Mountain Water Supply Capacity	260,000
Increase Mountain Pumping Capacity	180,000
Replacement/Upgrade Process Control System	38,000
Replacement Compressor	230,000
Mountain Piping/Distribution	500,000
Fan/Tower Snowguns and Electrical Distribution	920,000
Projects Subtotal	2,958,000
Contingency	292,000
Total Project Budget	3,250,000

Project Financial Analysis

This project will benefit the financial performance of the mountain in these key ways:

- The new beginner complex will increase both the number of skiers/riders using the facility, and will increase the revenue per skier visit for the learn to ski/ride program. A detailed Return on Investment analysis provided by the SE Group as part of the master planning process estimates the new beginner complex will generate \$185,000 in additional net income, and has a return on investment of 18.9% and a payback of 5.3 years.
- Overall skier visits will be increased, particularly during the pre-Christmas time frame due to increased snowmaking capacity. Management conservatively estimates that an additional 4,000 visits (less than 2.5% increase over 10 year

average visits) will generate \$158,000 annually through increased sales of lift tickets, rentals, lessons, retail and food and beverage sales.

- The increased capacity of the snowmaking system will open more terrain earlier, therefore shortening the time tickets are sold at a discount due to limited terrain. Management estimates an additional yield of \$8.00 per ticket during early December. On average, the resort has historically sold 2,400 tickets during this time period. This would provide an additional \$19,200 in income.
- Although the new snowmaking plant will increase the hourly power consumption by approximately 1200 kilowatts, snowmaking hours are expected to decrease from an average of 1,000 hours per year to an average of 700 hours per year. The savings can be calculated as follows:

	Existing System	New System
KW/H Used	3600	4800
Hours of Operation	1000	700
Total KWH Used (KW/H * Hours)	3,600,000	3,360,000
Cost of Power per KW	\$0.13	\$0.13
Total Power Cost (KWH * Cost per KW)	\$468,000	\$436,800
Annual Savings		\$31,200

- A shortened snowmaking season would reduce the staffing costs for seasonal snowmakers as well. Seasonal snowmaking wages have averaged approximately \$150,000 in recent years. Assuming a 20% reduction in these hours yields an additional savings of \$30,000 annually.

In summary, the expected positive financial impact of these improvements is:

1. Increased Net Income from new Beginner Complex	\$ 185,000
2. Increase in overall skier visits of 2.5%	\$ 158,000
3. Increase in early season ticket yield	\$ 19,200
4. Decreased electrical costs	\$ 31,200
5. Decreased snowmaking staffing costs	\$ 30,000
Total:	\$ 423,400

The highest annual debt cost of this project is in Fiscal 2010 at \$320,971. A complete principal and interest summary is attached to this report as Appendix 1. Using the above figures, the debt service coverage ratio for this project is strong at 1.32 times in year two, and increases to 1.35 times in year three.

Conclusions and Recommendations

The Gunstock Area Commissioners and management believe these improvements, coupled with other improvements which have been made in accordance with the master plan, will greatly improve the guest experience at Gunstock during the ski season, and will provide positive net income to the resort (and to Belknap County under the Memorandum of Agreement).

These specific improvements address four key issues brought to light through the master planning process, namely:

1. Increasing beginner/novice terrain
2. Increasing uphill capacity for beginners
3. Increasing the overall capacity of the snowmaking operation
4. Increasing the efficiency of the snowmaking operation

These improvements will result in earlier opening, additional skier visits, additional ski learning center income, and reduced snowmaking costs.

The Gunstock Commissioners respectfully ask for the authority to issue notes or bonds to fund these improvements as set forth in this document, and would ask that the following resolution be passed:

“Resolved that three million two hundred and fifty thousand dollars (\$3,250,000.00) of serial notes and bonds are hereby authorized and approved for the planning, acquisition, and construction of improvements to lifts, snowmaking, trails and associated structures to be completed as set forth in the 2008 Lift, Trail and Snowmaking Improvements Capital Project Proposal. Said borrowing shall mature 20 years from the date of issue. Any notes or bonds issued pursuant thereto shall be in accord with New Hampshire laws (1959) Chapter 399:15, as amended and the form, details and particulars of said notes or bonds other than the maturity thereof shall be determined by the Gunstock Area Commission. The full faith and credit of the county of Belknap, New Hampshire shall be pledged to the payment of the obligations issued pursuant hereto. Said notes or bonds shall contain and express that fees, fares, and tolls will be collected until the maturity thereof in acceptance with the provisions of Chapter 399 of the laws of 1959 as amended.