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## The Procurement of an Indoor Tennis Facility in Morris, MN: An Ex Ante Cost Benefit Analysis

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Emma Strachan

Cost Benefit Analysis

Dr. Kivi

05/06/14

## The Procurement of an Indoor Tennis Facility in Morris, MN: An Ex Ante Cost Benefits Analysis

### Introduction:

Imagine driving from Morris to Alexandria in horrible Minnesota winter weather to sneak into a hotel resort through the backdoor just to practice tennis indoors. Seem crazy? This is what the University of MN Morris tennis team has to do before the snow thaws on the courts outside. I will conduct a cost benefit analysis on the construction of an indoor tennis facility in Morris, Minnesota for the use of high-school students, college students, and the community.

This will be an ex-ante analysis, as I will be forecasting estimated costs and benefits, rather than using concrete data from an already completed project. The main goal of this paper will be to find the best alternative to meet the objective of acquiring indoor tennis courts for the town of Morris. While it may be difficult to rely solely on estimates, I will use publicly available information on the costs and benefits from similar completed projects. I will take into account the monetary and opportunity costs, as well as the benefits to different demographics; for example, the benefit to the college tennis program, and benefit to RFC membership and so on. I will mention who has a standing in this project, how I will monetize impacts of different versions of the project, how I will discount those across time, and how varying uncertain conditions in a sensitivity analysis might influence a decision maker. Let me begin by covering the alternative projects that could be undertaken.

### Alternatives:

It is beneficial early on in this analysis to talk about alternative projects that are realistic. While there are an infinite number of alternatives if you allow every parameter to take on every possible value, I will consider a couple I feel to be practical.

The first option, as with any cost benefit analysis, would be to do nothing. Here, there would be no monetary cost and no monetary benefit of the project directly. However, in this case, I feel it is

worthwhile to realize some sort of opportunity cost of not doing this project. Is the college team suffering from an impaired tennis program? Is the college losing revenue because they cannot bring in good tennis players? Is the town in need of more exercise options? Could this money to build a new facility be used for something more worthwhile? These are a few things to ponder when you consider doing nothing. One could feasibly consider the removal of these downsides (a bad tennis program, obesity levels in Morris, etc.) as actual benefits of doing this project, and therefore the route of “doing nothing” is essentially associated with a handful of significant costs.

A second realistic alternative would be to add on tennis compatible floors and equipment to the existing Regional Fitness Center (RFC) in Morris. There are two sub-plans here: The first, to make the existing courts multipurpose, and the second, to make a new, connected area with new non-multipurpose tennis courts. The first sub-plan would probably be a little more conscious of spending large amounts of money, while the second might be more beneficial in the long run if people valued a separate area for courts. Multipurpose floors give you the use value of playing tennis, basketball, volleyball, inline hockey, and badminton among other things. Normal surface tennis courts only give the use value of playing tennis, but college/high-school players get more worthwhile training on this type of court because their indoor practice more easily translates to how the ball will move outside.

The last alternative I will consider will be to build a small facility (separate from the RFC) with only indoor tennis courts. This is a popular option in other towns and seems to be profitable – with the inherent ability to hold tennis lessons for young kids, have people pay to reserve court times, or even to serve as an area for events.

While there are, of course, more alternatives than these, I think this is a well-rounded variety of options that can help us to analyze which specifics from which alternatives would be the most and least useful, profitable, or costly.

The implications all three alternatives would create are very similar. Whether existing court floors are revamped, or a brand new facility is built, an indoor tennis center would have similar impacts on college students, high school students, and the local area. The impacts that would apply to all alternatives could be things like; a better college tennis team, a chance for students to play intramural tennis, an increase in prospective students (although maybe a long shot), kids could have a safe outlet for their energy in tennis programs, and tennis programs could provide jobs (secretarial, administrative, teaching, maintenance, etc.). There are different consequences for different alternatives, but it really boils down to monetary consequences that will be significantly different. Before evaluating monetary

consequences it is worthwhile to mention who has a say in the worthiness of the program with respect to its implications on the local area.

### Standing:

Whose opinion matters when making decisions about moving forward with one of the plans mentioned above? A simple answer to this question does not exist. I have found that a relatively uncomplicated way to determine standing is to think about who will be financially affected by the outcome of a particular project. Therefore, part of my approach in determining who has standing will be to consider who will be paying for the construction, use, and maintenance of the courts.

Depending upon who is paying for the project, different groups of people will have an opinion that “counts.” If the project is to end up being publicly funded (through a tax of sorts) then everyone paying the tax would have standing. Obviously a tennis court does not give each person from each demographic the same level of well-being, so perhaps a local tax would not be the best way to fund an indoor tennis facility. If the project ends up being financed through the University of Minnesota, whomever is paying for tuition (students and student's parents, etc.) will have standing. The college would likely benefit from a better tennis program by drawing in more athletes and getting attractive publicity from better athletic opportunities and programs. However, you run into the same problem as a publicly funded facility, in that everyone paying tuition will not benefit from the new tennis facility at the same level. Considering the tennis team at the college is relatively small, the percentage of tuition-paying college students directly benefiting from a new facility is too small to increase the price of school for everyone. Perhaps increasing the tuition for funding isn't the best option either. If the project ends up being privately funded, the people that are interested enough to invest will have an opinion with weight. The Vancouver Board of Parks and Recreation had a very knowledgeable point and logical argument about where one should acquire funding for the construction of new indoor tennis courts (Professional Environmental Recreation Consultants, 17). They mentioned that the private sector is driven by demand (focusing on the benefits to users) while the public sector is driven by need (focusing on the indirect benefit to all citizens). I think it might be difficult to convince local government that indoor tennis courts would be a project that indirectly benefits all citizens. The most logical way to approach the funding would be through donations/contributions from the private sector. Perhaps a co-op type of system would be a way to entice donations, where everyone that puts money towards building and maintaining the facility owns a portion of it. When the facility starts to earn income, each investor will earn a dividend on the revenue earned. However, if an entire new building

will need to be financed, it is unlikely that the people of Morris are going to privately donate millions of dollars just to earn a small dividend.

Overall, the best way to determine who has standing in this particular situation would not only be to include those people that are privately paying for the project, but also to include those in the near vicinity of the final facility. The standing of people that live in the town and/or live close to the facility would have legitimate benefits and costs that would best reflect the true positive and negative implications of the project. I have chosen to also include the standing of people that live in close proximity to the indoor courts (in addition to investors) because I believe that they will experience significant positive and negative externalities from things like increased traffic, a place to go let your kids play, more noise, fun activities, etc.

Now that we have determined the best way to fund the project, who will be most affected by its impacts, and consequently who will have standing when it comes to controversial decisions, we can move on to assigning monetary values to each individual alternative.

### Monetizing the Impacts:

To best understand which alternative would be the most appropriate, a valuation of the monetary impacts for each plan is necessary. An easy way to understand financial implications would be through a valuation of income and expenditure. I will start with the monetary costs and benefits that will apply to all alternatives; then I will specifically mention how each alternative may differ in their precise monetary consequences.

Revenues that each alternative would realize would be the opportunity to offer lessons, leagues, camps, and other programs. Each alternative could also offer open court time for a flat fee, and contract time for events – prices contingent upon the number of hours the facility is used.

Operating costs that each alternative would incur would be wages and benefits for full time and part time workers. Seasonal tennis pros would be hired to teach camps and lessons. More expenses would come in the form of utilities; like gas, electric, water, sewer, telephone, internet, trash removal, etc. There will also be other notable costs for any facility like insurance fees, court supplies, maintenance and repair, along with marketing and promotional expenses. Of course it is also important to take into account the initial cost of construction – which will be significantly different for each alternative plan.

The first alternative I would like to monetize impacts for would be doing nothing. While some

might think the costs and benefits of doing nothing are \$0, I would argue that there is actually an opportunity cost of doing nothing. The way to best understand this non-market cost would be through the travel cost method – coined in 1933 by Harold Hotellins. (Lecture, April 14). This method would assume that the value of an indoor tennis facility would be at least as much as what people are spending to play indoor tennis now. So we have to answer the question: “What are people giving up to play indoor tennis now?” Besides losing some dignity from sneaking into a sub-par hotel court in Alexandria, I personally gave up gas, study time, and sleep to be able to play tennis indoors. Unfortunately some of the things I gave up to play also cannot be directly monetized, and because I don't want to try to monetize what I give up to sleep, (as I feel this would diverge from my true point) I think at least the cost of gas can be reasonably justified as a cost of doing nothing. While more people may be driving to Alexandria to hit than just the college tennis team, the players on the UMM team can give us a rough estimate of gas costs. If the team has to take two cars, and they start going once a week a couple months before the season starts, this means the total miles put on an average passenger car which gets 22.4 MPG (Transportation: Cars: Average Miles per Gallon., 1) is 1,414.4. Doing some simple math you can find that total gallons needed are 63.14. Gas currently costs \$3.56 which means the amount that college tennis players are spending on travel cost is \$225. While I feel this largely undervalues the true cost of doing nothing – it at least shows that the cost of nothing is not \$0.

The second alternative I mentioned was to make the existing floor under the walking track at the Regional Fitness Center (RFC) multipurpose. There would only be room for one court, but revenue could still be earned from private lessons and small camps, and costs assumed would not be much more than the cost of redoing the floor since the RFC already has its own operating costs that are covered by memberships and tuition.

The revenue earned from tennis lessons and programs at the RFC would simply be the increase in memberships. Because it is hard to tell without an extensive survey (which would have its own intrinsic difficulties) who would buy a membership to the RFC because of an indoor court, I will value this revenue in a different way.

The RFC has a system in place where having reserved personal time for certain areas (courts, pools, sand volleyball, etc.) does not come with a membership card (Memberships <<Regional Fitness Center, 1). I will assume that people who are members of the RFC would get a 50 percent discount on the court fee, while people that didn't have a membership would have to pay at full cost. Courts in Alexandria at the Arrowwood Resort go for \$18 an hour to the public, (this I know from personal

experience) so I think to fuel competition, the RFC could put their fee for an hour of court time at \$15/hour for the public and \$7.50/hour for members. This would incentivize people to buy RFC memberships, but would also bring in revenue from people that live a bit farther away who may find it inconvenient or unrealistic to buy a yearly membership to the RFC for around \$500 (Memberships <<Regional Fitness Center, 1). If the court were utilized at 60% and we assume that half of the usage is from members and half is from the public, and the RFC is open 108 hours a week, the extra revenue earned by the RFC from indoor tennis courts is \$729 a week or \$36,450 a year (assuming the RFC is closed around 14 days a year). A more optimistic valuation would be that the courts are used at a high rate, say, 80%. This would mean the extra revenue earned would be closer to \$972 a week or \$48,600 a year. Camps, private lessons and rental agreements for parties would earn more absolute revenue, but with paying the extra staff to teach the camps/lessons, monitor events, and clean up after, the general range of revenue would end up being the same as court time – so I have assumed it into my number above.

The cost incurred from this particular alternative would essentially be the cost of the new floor and tennis equipment. The lower bound on the cost of a new multipurpose floor would be around \$15000-\$20000. (FAQ—Frequently Asked Questions, 2014). While it is important to have the right kind of lighting in a tennis facility, this is my cheapest alternative and I would like to keep it that way. I think that the lights currently installed in that section of the RFC would be reasonable. The only other equipment needed would be a net, which costs around \$150 and posts which cost around \$200 (Putterman Tennis Nets, May 2014). Additionally, the startup costs for ball baskets and balls would be around \$200. This puts the year zero construction cost for a new tennis compatible area in the RFC between \$15,550 and \$20,550. A court this size would be relatively low maintenance, so for this alternative I would assume the RFC would not need to hire more staff to take care of the added work. As mentioned earlier, the extra cost of hiring a tennis pro to teach camps/lessons will be balanced out with an extra fee for players, therefore, the revenue earned from camps and lessons at the RFC is assumed to be the same amount per hour as reserved court time.

This first alternative will by and large be the cheapest option, and I think the existing staff at the RFC could be utilized. Operating costs of the court itself will be virtually zero, since the RFC is already an established entity with workers that would have the time to take on an extra phone call or mop the floors at the end of the day. The RFC is also established with insurance, has its own marketing and promotions, and would pay for the same amount of utilities with or without a tennis court – So the cost of the project itself is really only the construction of the court. This would put yearly benefits

around \$36,450 to \$48,650 and an initial startup cost at \$15,550 to \$20,550 – meaning the facility would be profitable even in the year of construction.

While I have been concentrating on tennis, it should be worth mentioning that the reason I have chosen multipurpose flooring is so that the facility will appeal to a larger demographic than just tennis players. I know that currently, this area of the RFC is used for some intramural sports and a few fitness classes, so the multipurpose floors would not negatively impact those people that are already using this area. With the multipurpose floors, the RFC will not lose money from people dropping fitness classes due to the floor being uncomfortable during their workout.

The second alternative I mentioned was to have a separate small indoor tennis facility with real tennis court flooring. The startup cost of this would be much larger than simply redoing the courts in the existing RFC building. The second alternative and the third are cohesive in that they would both be a small 8 court facility. The only real difference is that one would be financed through the RFC and the other would be privately financed as its own entity. An indoor tennis center costs around \$62.52/square foot to build which would include all capital (the building, the courts, lights, nets, etc.) and site development, along with construction costs (The Sports Management Group, 16). This would put construction cost at about 4.2 million dollars. I am aware that the RFC is not in the current position to make this big of an investment, and that the initial cost of the project would be too much debt for them to take on (RFC Financials). This leaves us with the option of the creation of a new entity which would likely be funded by a city backed bond. The City of Lake Oswego in Oregon has a great analysis of the costs and benefits of financing such a facility which can be seen at the end of this paper.

Lake Oswego is almost four times the size of Stevens' country (which is roughly the area this new tennis facility would likely serve), so I have cut the revenue by 75%. This assumes that the same proportion of people in our area would be interested in indoor tennis as the people in Lake Oswego; because of the relatively large sample size, I feel this is just. Total revenue from access card fees, youth and adult classes, special events, daily court fees, seasonal court fees, and miscellaneous income/grants for a facility serving the 10,000 people of Stevens County would be just under \$115,000.

As far as expenses go, I feel it is justifiable to cut the salary expense Morris would experience by 75% because the facility is smaller, so less people need to be on staff. It would be excusable to cut this as much as I cut the revenue, following the same pattern of monetary adjustment with regard to the population size. While there could be economies of scale that would deem my particular cut over-exaggerated, I would like to show the worthiness of the project using the most pessimistic valuations



and worse case scenarios of costs and benefits. This will go to show how much this program could benefit the city, even if things don't go perfectly as planned. Therefore, the adjusted salary expense I will use will be \$53,344/year. As far as materials and supplies go, I will use the numbers from the Oswego valuation because things like office supplies, electricity, advertising, and bank service charges are, for the most part, universal: The same goes for the "Transfers to the General Fund" Section of the Oswego analysis, which includes things like "administrative oversight," and "insurance fees." This makes my adjusted sub total operating expense (which doesn't yet include a debt service charge) \$122,732. Because the operations analysis run in Lake Oswego, Oregon was actually a plan to revamp an existing court, the analysis accounts for around 2.2 million dollars' worth of revenue in year 0 from selling an existing building. The Morris facility would be built from the ground up, so we would be looking to acquire 4.2 million dollars of capital cost through bond funding in year 0. This simple valuation of the costs and benefits of a new facility shows that even without a 4.2 million dollar startup cost, an 8 court indoor tennis facility in Morris would have operating costs that outweigh benefits starting in year 0 and continuing for the life of the project.

To get a clear picture of the different money implications of each project over time, I will show how each alternative is, in effect, "discounted" over a set number of years.

### Discounting Benefits and Costs across Time:

It is important to discount the future when estimating the net benefits over the life of a project because life is finite, which essentially means that money in your pocket today is "worth" more than money in your pocket tomorrow. To discount the benefits and costs across time I will use a terminal value of 15 years because the multipurpose floors from Sport-Tek come with a 15 year warranty. (FAQ – Frequently Asked Questions, Apr. 2014) The discount rate to choose was a little bit difficult. I wanted to choose something between the marginal rate of saving (MRS), which is the low interest rate received by savers, and the marginal rate of return on private investment (MRRP), which is the high interest rate people pay to borrow. To calculate these percentages, it is important to find a tax rate and inflation rate that represent the people of Morris and the nearby area. The tax rate I will use is 10% which is the tax on interest income at the lowest tax bracket. The inflation rate I will use is 1.5%, the current inflation rate in the United States.

To calculate the marginal social rate of time preference (the lower bound on discount rate) one must use the interest rate paid to investors in a safe asset, I will use a ten year treasury bond, which is currently fluctuating around 2.7%. Now we are able to calculate the following:

$$Pz=r/(1+t)\text{-inflation}$$

$$Pz=.027/(1.1) - .015$$

$$=.0095 \text{ or } .095\%$$

To calculate the marginal rate of return on private investment (the upper bound on discount rate) one must use the interest rate paid to investors in a risky asset, I will use the interest rate on a 30 year mortgage, which is currently fluctuating around 4.4%. We can now calculate the upper bound.

$$Rz=((1+t)*r)\text{-inflation}$$

$$Rz=1.1*.044-.015$$

$$=.034 \text{ or } 3.4\%$$

The discount rate to use should lie somewhere in between the two percentages calculated above. Because I am leaning toward a privately funded project, I will choose a discount rate closer to the upper bound, since the marginal rate of return on private investment better accounts for the risk component included in private investments. Given my calculations, I will use a rate of 3% for my valuation, of course this rate could be varied in the sensitivity analysis to follow. Below are the net present values (NPV) for each project; including doing nothing, updating the existing RFC floors, and building a new 8 court facility respectively.

### Net Present Values for each Alternative

To calculate the net present values for each alternative, I will take the benefit minus the cost for each year (starting in year 0), divided by 1 plus the discount rate, for the terminal number of years (15). This will allow the reader to more clearly see the monetary implications that come along with construction costs for a new facility versus refurbishing an existing space.

## Doing Nothing:

$$NPV = \sum_{t=0}^{15} \frac{-225}{(1+.03)^t}$$

Year	Discount Rate	NB/Year	NPV
0	0.03	-250	-250
1	0.03	-250	-242.718
2	0.03	-250	-235.649
3	0.03	-250	-228.785
4	0.03	-250	-222.122
5	0.03	-250	-215.652
6	0.03	-250	-209.371
7	0.03	-250	-203.273
8	0.03	-250	-197.352
9	0.03	-250	-191.604
10	0.03	-250	-186.023
11	0.03	-250	-180.605
12	0.03	-250	-175.345
13	0.03	-250	-170.238
14	0.03	-250	-165.279
15	0.03	-250	-160.465
Total Net Present Value of Project:			-3234.48

## Repurposing the Existing RFC Floor

$$NPV = \sum_{t=1}^{15} \frac{36450-20550}{(1+.03)^t} + \frac{36450}{(1+.03)^0}$$

Year	Discount Rate	NB/Year	NPV
0	0.03	15900	15900
1	0.03	36450	35388.35
2	0.03	36450	34357.62
3	0.03	36450	33356.91
4	0.03	36450	32385.35
5	0.03	36450	31442.09
6	0.03	36450	30526.3
7	0.03	36450	29637.19
8	0.03	36450	28773.97
9	0.03	36450	27935.89
10	0.03	36450	27122.22
11	0.03	36450	26332.26
12	0.03	36450	25565.3
13	0.03	36450	24820.68
14	0.03	36450	24097.74
15	0.03	36450	23395.87
Total Net Present Value of Project:			451037.7

## Building a New Tennis Facility

$$NPV = \sum_{t=0}^{15} \frac{-4085000}{(1+0.03)^t} + \frac{-7732}{(1+0.03)^t}$$

Year	Discount Rate	NB/Year	NPV
0	0.03	-4085000	-4085000
1	0.03	-7732	-7506.8
2	0.03	-7732	-7288.15
3	0.03	-7732	-7075.88
4	0.03	-7732	-6869.78
5	0.03	-7732	-6669.69
6	0.03	-7732	-6475.43
7	0.03	-7732	-6286.82
8	0.03	-7732	-6103.71
9	0.03	-7732	-5925.93
10	0.03	-7732	-5753.33
11	0.03	-7732	-5585.76
12	0.03	-7732	-5423.07
13	0.03	-7732	-5265.12
14	0.03	-7732	-5111.76
15	0.03	-7732	-4962.88
Total Net Present Value of Project:			-4177304

For the calculation of NPV for each alternative above, I chose to use the most pessimistic projections of both costs and benefits (most costly and least beneficial scenarios) for each project. I assumed the lowest percentage court rates, and that private investors would not be able to acquire a city backed loan for the brand new facility.

The acquisition of different loans with different interest rates to finance a new 8 court facility is something I would vary in my sensitivity analysis below. However, because the operating expenses of a tennis facility in Morris would outweigh the yearly revenue, I don't feel it is worthwhile to calculate different NPVs with different loan payments amounts, because the facility will not be profitable in any situation. For my sensitivity analysis to follow, I chose to only vary uncertain parameters for feasible (meaning profitable) projects.

## Sensitivity Analysis:

A sensitivity analysis consists of changing indeterminate restrictions. For my first alternative, I will vary the quality of multipurpose floor the RFC is going to buy, as well as if they would like to purchase a new tennis compatible lighting system. I will also vary the discount rate to see at which point the project becomes unprofitable (or if there even is such a point).

If the RFC does decide to install lighting, the initial cost will be around \$8,850 ("Athletic > Tournament & Club Tennis Court Lighting Packages > Single Court."). If you recalculate NPV for the

second alternative, the project still acquires \$442,737 of revenue over a 15 year period.

If the RFC decides to install lighting, and the most expensive multipurpose floors one could find, would the project still be worth the trouble? Let me put it this way; even if the RFC chose a floor worth \$462,500, the project would still be in the black over a 15 year period at \$237. This is to say, the highest possible quality multipurpose floor would not be out of reach.

Varying the discount rate for this particular project shows a fairly obvious outcome. Even at a discount rate of 100%, the project still earns \$44,048 over a 15 year period. Intuitively, this makes sense, as even the year 0 cost with construction does not offset the yearly benefits.

### Final Recommendation:

It should be clear to the reader by this point what the most profitable, realistic alternative is. My final recommendation would be to update the existing RFC floors with multipurpose/tennis compatible floors. This would bring in enough extra revenue from reserved court times/lessons/etc., and wouldn't impede the revenue the RFC already takes in from preexisting classes that use that same area. The operating cost of updating the RFC would be virtually zero after the initial construction cost, and compared to a multimillion dollar new tennis facility, this decision is less risky, and better fits the demand needs of the local area. The sensitivity analysis showed that even discounting at a rate of 100% this project would be worthwhile, and since a 100% discount rate is highly (if not totally) unlikely, this analysis has shown that a significant amount of money will be able to go into the new floors/lights/nets/etc. and that this project can be finished with superior results. Because I think the best way to fund this is through private investment, a more inexpensive alternative has the greatest probability of coming to fruition. Overall, updating the existing floors at the RFC is the best, most realistic, and most profitable way to bring an indoor tennis court to Morris Minnesota.

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	Capital Outlay (depreciation)									
	Allocation to Capital Reserve Fund									
	\$40,000	\$40,000	\$40,000	\$40,000	\$40,000	\$40,000	\$40,000	\$40,000	\$40,000	\$40,000
<b>TOTAL ANNUAL EXPENSES</b>	\$376,110	\$286,256	\$682,112	\$696,100	\$704,460	\$719,620	\$729,160	\$743,930	\$758,800	\$784,212
<b>NET REVENUE</b>	\$83,905	\$173,759	\$128,308	\$114,320	\$105,960	\$143,265	\$133,725	\$118,955	\$104,085	\$94,095
<b>ACCUMULATED EARNINGS</b>	\$200,284 *	\$374,043	\$902,251	\$916,671	\$722,631	\$865,886	\$999,621	\$1,118,576	\$1,222,661	\$1,316,756
										\$1,412,636

\* Includes \$16,579 balance from prior years accumulated earnings after transfer of \$60,000 to capital funding.  
 \*\* Contracted services for program coordinator and instructor is included under "salaries"



Lake Oswego Tennis Complex  
 Financial Analysis