

Seattle Department of Parks and Recreation
 Facilities Maintenance & Development

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To Don Harper	From Ted Holder	
Gen. Dept.	Co.	
Phone #	Phone # 11921	
Fax # 121	Fax #	

MEMORANDUM

February 4, 2000

TO: Kevin Stoops

FROM: Kevin Crouthamel *KC*

SUBJECT: Ballfield Investment Evaluation

REFERENCE: Your January 27 memo (assignment)

This evaluation matches some DPR critical major maintenance needs with program opportunities for neighborhood, larger communities and the City as a whole. The Department needs more field programming and existing fields in need of turf renovation are primary candidates for installing new synthetic all-weather surface. However, some attention should be given to systematic renovation of aging facilities. Two somewhat distinct needs are seen - Program capacity and major maintenance. They are neither mutually exclusive nor inclusive. Increases in program capacity can come from creating new fields or replacing existing lighted natural grass fields to synthetic or all-weather surfaces. Old fields can and will continue to be nominated for major maintenance renovation for grass turf use, because this is the most suitable at that site.

DEMAND - The trend in ballfield hours used climbed over the past seven years throughout the City. The North and South end grew by 17% while the Central District leveled off, likely part as a result of large turf renovation of Garfield and Bobbie Morris. During the period 1993-1999 the Department shifted some programming onto SSD fields and improved all-weather field use intensity to meet growing demand. Forecasts of future grow also suggest continued steady growth. See Attachment A - Field Use Comparison & Forecast. Current trends by activity, gender and age are as follows:

CURRENT USE TRENDS FOR BALLFIELD USE
 AT SEATTLE DEPARTMENT OF PARKS AND RECREATION

Activity	Girls	Boys	Co-rec	Men	Women
Softball	(+ +)	n/a	(+)	(-)	(-)
Baseball	n/a	(+)	n/a	(0)	n/a
Soccer	(0)	(+)	n/a	(0)	(0)

(+) = growing (-) = declining (0) = no change Source: Citywide Athletics.

The Department does have per field data and when field use nears or exceeds maximum use, over a multi-year period, this indicates heavy demand. For example West Queen Anne, Maplewood is consistently programmed to a maximum capacity. Montlake has very modest

use, but this does not reflect demand but poor field conditions that restrict use. Dahl's use has fallen slightly.

CAPACITY - Field capacity limits are exceeded beyond 1,000 annual hours of scheduled play for soccer and baseball fields. If lighted, these could add another 200 hours for a 1,200-hour total each. Lighted all-weather fields are capable of programming up to 2,000 hours. (Miller had 2,400 hours in 1999). New all-weather polyethylene/polypropylene turf (a.k.a. Synthetic turf) has a program capacity of approximately 2,800 hours, limited only by evening hours past the 11 PM DPR restriction and early weekend morning disinclination's of players.

MAINTENANCE - The Department has 184 fields at 63 sites. According to the Department's Critical Major Maintenance Plan Field Assessments, 45% are worn out and need renovation or replacement within the next biennium. The maintenance ranges from turf replacement and sand amendment to total replacement of turf, drainage, irrigation and fencing. A rough total estimate of current and deferred major maintenance at these 83 fields is \$20-30M, of which 72% has accumulated or been deferred and 28% fallen due in the 2001-2002 biennium. Of the total, 78% is for major renovation and the remaining 22% for minor renovation, usually turf and sand soil maintenance. The initial programmatic impact of putting off field renovation is a marginal decrease in playability and then demand. But as the field falls beyond any effort for turf restoration the project turns from "minor" to a "major" maintenance. This is usually accompanied by a decline in the site drainage from thatch buildup and uneven grade. Fields like Dahl, Riverview (south), Montlake, E. C. Hughes and Soundview (west), appear to have passed this mark.

EVALUATION OF FIELD PROJECTS - An intuitive evaluation of field improvements has been used in the past. This methodology combines use data, Critical Major Maintenance field assessments by design and maintenance staff, as well as community input from citywide and neighborhood users and non-users. Priorities were also made with consideration of the DPR/SSD use agreement and the SSD Levy program. A suggested minor addition to the process might be some level of benefit-cost assessment of different types of ballfield investments. This is useful because the Department is at the threshold of deciding among surface types (synthetic turf, all-weather surface or natural grass turf) for high use sites proposed for major renovation or replacement. Replacement by synthetic turf increases program capacity by 2.3 times over grass turf. Although the initial capital cost for synthetic turf is twice the initial capital cost for grass turf, this difference shrinks to only 22% over a thirty-year life combining capital and maintenance costs.

A benefit-cost model is shown in Attachment B, showing a significantly larger net benefit over other lighted field surfaces. Plausible variations were inserted in the amount of benefit the public would likely attribute, the discount rate (real rate of return) or levels of turf field maintenance. None of these altered the ranking or the positive net benefit of lighted synthetic turf fields in consistently achieving the maximum benefit alternative and the most favorable benefit to cost ratio. A process for making decisions and priorities is suggested in Figure 1 (See attached). This process aims at suggesting both projects that will significantly increase

programming as well as those that attend to major maintenance of serious declining existing fields.

Though not included in the Benefit-Cost Model, environmental considerations should be added to any decision. A significant positive attribute of synthetic turf is that no water and no fertilizers or herbicides are used. Carried over a useful field life of 30 years this is a significant benefit. In the near future it may also translate into meaningful funding support by SPU or other agencies sensitive to water pollution.

IDENTIFICATION OF PRIORITY IMPROVEMENTS

Strategy

- A. Complete phased projects started in the 2000 CIP to provide continuity to the involved neighborhood and the Department's overall ballfield development program.
- B. Provide lighted synthetic turf at larger complexes, Citywide or Community Fields, where heavy use or demand exists, preferably where lights already are in use and where the field condition and useful life already requires major renovation.
- C. Many turf field sites are not suitable for lighted synthetic surfaces. As they wear out, and programming and condition shows decline, replace in-kind.
- D. Carry out turf maintenance on other turf fields to prolong their useful life before turf and surface grade and drainage deteriorates past help.

The list below excludes City projects identified in the Joint School/Park program such as Sand Point. If the Department was to move ahead with some limited investment in the former Navy fields at Sand Point, lighted synthetic turf soccer field and softball fields should be the Department's first priority. If it is to be considered separately from the CIP CRF projects, then the projects recommended in order below, via SRC on February 2, 2000, should be considered priorities for ballfields.

Field Renovation - For CIP limit of \$2,000,000-2,500,000

- 1. Riverview (turf field renovation - completion of south & all of north) Phase II
\$2,000,000

Reason - Most demanded girls' softball tournament site in City. Heavy demand cannot be met with poor field condition. Not a candidate for lights or synthetic however. The south two ballfields and soccer field in Phase I (2000 CIP) are to receive new drainage and replaced irrigation, sand-soil base for grass turf for about \$600,000. This Phase II project will complete the south project with new fencing and backstops and accessible paving plus match both these phases of work elements on the north half of the site (two softball fields and a soccer field). This project fits Strategy A and C.

- 2. Judkins (turf field renovation) Phase II only
\$ 400,000

Reason - This project matches Phase I (scheduled for 2000 on the north half of the site), with similar work on the south half of the site. Each phase of work will provide new drainage, irrigation, topsoil and natural grass for 1 softball and 1 soccer field. Heavy community use,

involvement and expectations. The new turf will improve programming. This project fits Strategy A and C.

NEXT PRIORITIES (OUTSIDE A \$2.5M BUDGET LIMIT)

Field Renovation

- **Loyal Heights** (121,000 s.f. 2 softball, 1 soccer/football field turf field replacement with synthetic turf) **\$1,786,000**

Reason - Program demand high but use wavered in past few years because of poor turf condition. NW is underserved even if Sand Point is developed. This field, like W Queen Aane and Brighton is already lighted and at most it will require re-lamping, cleaning and minor adjustments (\$30,000 and not replacement (\$300,000). Programming capacity can be more than doubled here with synthetic turf.

Lighting Installation

- **Genesee** (light one all-weather soccer field) \$350,000 - Lighting can at least double programming of this all-weather surfaced field. Lighting all-weather fields (not already lighted) has a high net benefit and B/C ratio as an investment. The Department's only non-lighted all-weather surface field in Genesee.

Conversion to Synthetic Turf

- **Brighton** (2 softball, 1 soccer/football field turf field replacement with synthetic turf) Like Loyal Heights above, this investment will have a major programming impact. - \$1,500,000

Field Amenities Improvements

- Drinking fountains (10 sites) \$80,000; ADA access (5 sites) \$200,000, fencing (8 sites) \$96,000; total of \$376,000.

BENEFIT-COST METHOD - ASSUMPTIONS

GENERAL - The Benefit-Cost Model establishes an investment measure to maximize programming.

As such it is a useful means to gauge new potential projects to determine which has the maximum net benefit. Since program hours are part of the benefit function, the net benefit is in reality a net benefit of program capacity translated into value or dollars.

Where projects are not garnering significant additional program value, the B-C Method is less appropriate. In the case of worn out turf fields, the programming increases are marginal estimated at 20-25% for turf field replacement. Maintenance costs thought to escalate for antiquated field infrastructure are not proven, but actually decline to a "get by" level.

BENEFIT

Description

The benefit-cost model compares only field improvements. Site or service amenities, parking, comfort station, ADA access and etc., are not included. For a comparison of a single soccer field, these are likely to be equivalent in size and therefore cost for each type of field surface investment. However, the added margin of total cost escalation would vary from 17% to 45% addition to the project, with the smallest marginal increase associated with the highest-cost project. Adding site amenities would therefor be more feasible when applied to large-scale field development since they would have less per game cost impact.

Hours Per Year

These are the maximum programming hours expected for each field type in one year. Lighted synthetic turf field programming exceeds program capacity of lighted all-weather fields because the former sometimes is unsafe during severe weather conditions. Portland has anticipated programming capacity of up to 4800 hours per year but their lighting hours are not restricted as they are in Seattle.

Programming on un-lighted fields is restricted by hours of darkness.

Actual & Inferred Benefit/Hour

Two teams, with 20 players per team x two teams, pay \$0.55 per person per hour for a total hourly fee of \$22. Many nearby comparable facilities, King County, Federal Way, SeaTac, charge similar rates for turf play, but add slightly more (\$.20-.30 per person/hour for lighting). Preliminary discussion with a number of league players and officials indicated that a value at more than the above amount but at least \$0.50 more per player hour for a total of \$64 per hour for play on a play surface that was uniformly and consistently high quality. All mentioned the synthetic turf at Queen Anne as such a field. Alternative private facilities in or outside the City charge fees above this premium. Portland charges a modest field use charge at the new Delta

Center except for lighted games, which adults are asked to pay more than \$2 each additional per hour.

So the per hour fee assumptions applied to each type field begin at the existing base of \$44 per hour, twice the current rate. For lighted fields, an additional \$10 per hour might be a reasonable expectation to recover lighting costs. For premium fields offering consistent, high-quality play, year-round, the public might be willing to pay a modest premium of \$0.25 per hour additional, hence the assumption of \$54/hour for synthetic turf play and \$64/hour for lighted synthetic turf play.

PV \$ Benefit - This is a method to even money comparisons over annual time periods of cash outlay or income, by adjusting all investment and cost to present-day dollars or **Present Value (PV)**. Excell's PV function as well as standard interest tables provide formulas and factors. These factors have been applied to all future incremental benefits and costs so that all may be compared in current dollars. The appropriate discount rate or percentage of compound interest is debatable. A rate of three and one half percent (3.5%) has been recommended by the City Budget Office as the most realistic discount rate, excluding inflation. This rate provides a current real rate of return on most money investments.

NPV \$ Investment - For costs incurred at one time in the future a slightly modified formula is provided in Excel to determine the **Net Present Value** of a cost that falls due some point in the future, but discounted to current dollars. For example, a \$500,000 capital investment required ten years from today, will be discounted by a factor of (0.7089) for \$354,000 in current dollars.

COST

Capital Cost

Cost estimates for synthetic fields include vendor material and site construction costs factored 60% to include associated costs. Other capital costs were supplied from recent similar projects.

Capital Maintenance Yr 10

It is assumed that the surface (plastic turf) will be removed, disposed of and replaced with a new carpet after 10 years. Some minimum fine re-grading of the aggregate subsurface will also be accomplished. Of three product vendors, two offer five year warranties and one offers an eight year warranty. Portland staff indicated a desire to achieve ten and possibly twelve years life from a synthetic turf surface. Much depends upon the type of play. Football/rugby will likely create more unevenness over time. The performance of ultraviolet light inhibitors in the turf will be a major factor in longevity, as the blade become more and more brittle before finally breaking off, exposing more rubber granules to migration/loss and diminishing the play value and safety.

Sites that spread debris onto the field, especially pine needles or road grit, are also apt to contribute to accelerated wear.

PV Cap Maint Yr 20

This repeats the ten year capital maintenance replacement but with a preset value discount rate for 20 years.

Annual M&O

These costs reflect optimal levels of resources needed to achieve 30 years of useful play value from each type of field. Although staff believe turf fields to have a twenty year span, for turf, the other infrastructure components for fields, drainage, irrigation, lights, all have thirty years expected useful life. So by assuming an optimal or prescribed turf management program, as costed for turf fields annual maintenance and operations (M&O), a more even comparison can be made.

PV \$ Cost
(K)*

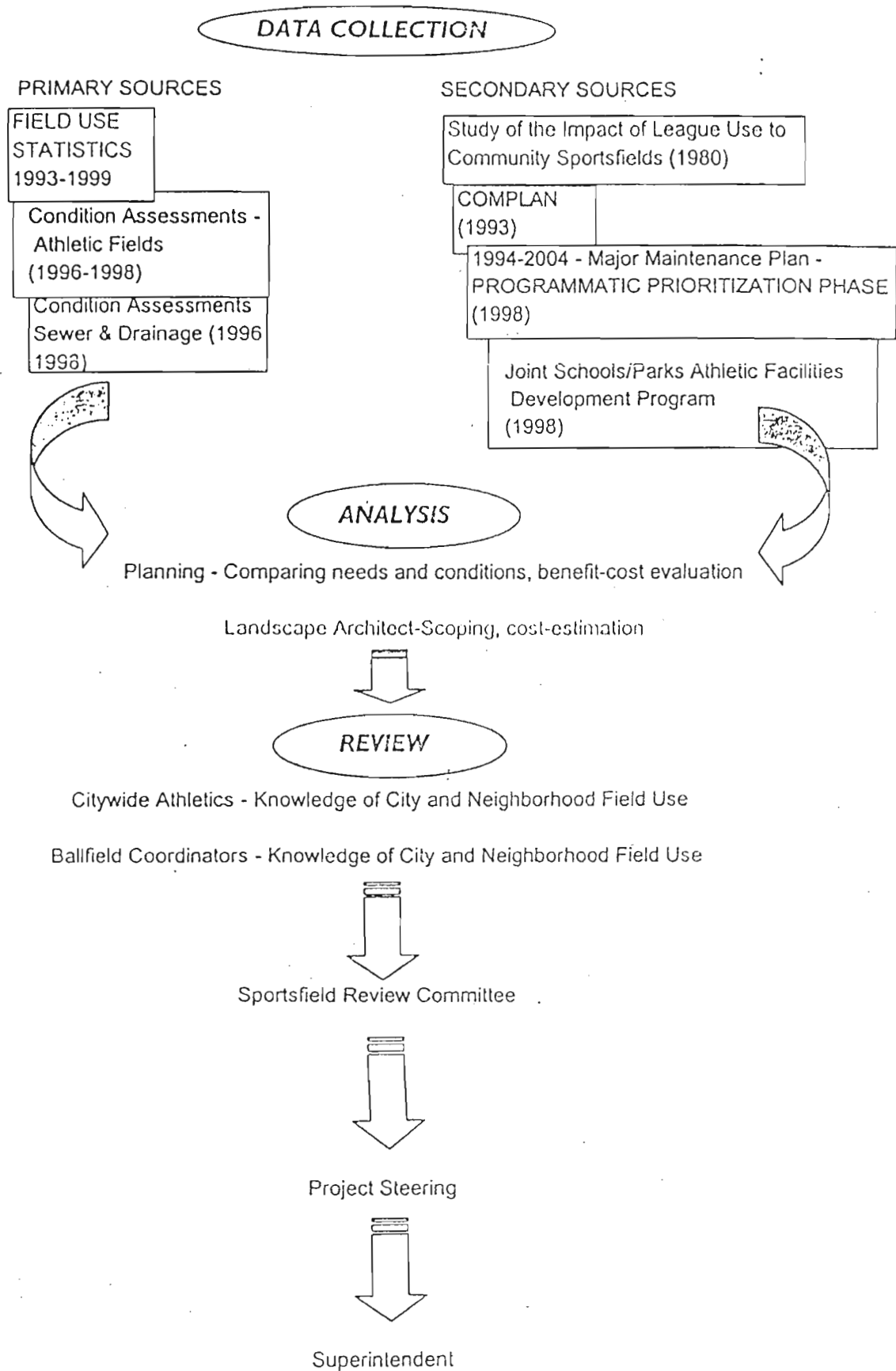
This box, labelled "K" is the sum of the previous box "J" multiplied by the 20 year discount rate to determine the present-day dollar cost.

BENEFITS AND COSTS IMPLIED AND NOT MEASURED

Quality of the fields is measured by expected public willingness to value synthetic and lighted field time over others. This may be understated for synthetic since no alternatives are available

Figure 1

PROCESS FOR SELECTING BALLFIELD RENOVATION INVESTMENTS



Attachment A - FIELD USE COMPARISON & FORECAST

								Trend	FORECAST	
								2006		
CENTRAL	1993	1994	1995	1996	1997	1998	1999			
Fields	41	41	41	43	45	48	51			
Total Hrs	22301	20697	23987	23757	26987	23418	26146	17%	31034	19%
Hours/Field	544	505	585	552	600	488	513			
NORTH										
Fields	62	62	62	70	72	71	69			
Total Hrs	36013	34057	33239	39294	37004	38716	37509	4%	42823	14%
Hours/Field	581	549	536	561	514	545	544			
SOUTH										
Fields	60	60	65	68	72	75	76			
Total Hrs	28337	27997	30582	31637	31094	36501	33023	17%	42588	29%
Hours/Field	472	467	470	465	432	487	435			
DPR Use of SSD										
Fields			58	64	63	63	68			
Total Hrs			8495	9529	7118	11805	11926			
Hours/Field			146	149	113	187	175			
Adult Practico				4517	4517	0	3475			
DPR TOTAL	1993	1994	1995	1996	1997	1998	1999		2006	
Fields	163	163	226	245	252	257	264			
Total Hours	86651	82751	96303	108734	106720	110440	112079	29%	151268	35%
Hours/Field	532	508	426	444	423	430	425			

Attachment B - BENEFIT-COST MODEL OF ALTERNATIVE PROJECTS (3.5% P/W Rate) (Source: New Development)
 (lighted/non-lighted, synthetic, all-weather, turf fields)

BENEFITS

DESCRIPTION	Capacity Hrs/Yr	Actual & Inferred Benefit/Hour \$	\$ Benefit/Yr	\$ Est Value sum for 30 Yr	P/W \$ Benefit 3.5% 30Yr C	Benefit-Cost \$ E/O	Benefit/Cost E/O	BENEFITS	
								Total Benefit	Net Benefit
lighted, synthetic turf	2,800	64	179,200	5,376,000	\$ 3,295,855	1,242,891	1,605	733	1
lighted All Weather Surface	2,000	54	108,000	3,240,000	\$ 1,986,341	208,699	1,117	889	2
lighted Turf	1,200	54	64,800	1,944,000	\$ 1,191,805	(435,838)	0.984	1,356	3
synthetic Turf	1,200	54	64,800	1,944,000	\$ 1,191,805	(469,199)	0.718	1,384	4
all-weather Surface	1,000	44	44,000	1,320,000	\$ 809,250	(576,432)	0.584	1,386	5
all-weather Surface	800	44	35,200	1,056,000	\$ 647,400	(588,282)	0.524	1,545	6

COSTS

DESCRIPTION	Capital Cost (Million \$)	Cap Maint Yr 10	NPV Cap Yr 10 Hr (7039)	Cap Maint 20 Yrs	NPV Cap Yr 20 Jr (5027)	Annual M&O	sum M&O 30Yr	Pv of L 3.5% 30 Yrs L	TOTAL COSTS	
									Sum of G+H+K+N	Sum of G+H+K+N
lighted, synthetic turf	1,300,000	500,000	354,450	500,000	251,378	8,000	240,000	\$147,136	\$	2,052,964
lighted All Weather Surface	950,000	-	-	-	-	45,000	1,350,000	\$827,642	\$	1,777,642
lighted Turf	300,000	-	-	-	-	45,000	1,350,000	\$827,642	\$	1,627,642
synthetic Turf	1,000,000	500,000	354,450	500,000	251,378	3,000	90,000	\$55,176	\$	1,661,004
all-weather Surface	650,000	-	-	-	-	40,000	1,200,000	\$735,682	\$	1,385,682
all-weather Surface	500,000	-	-	-	-	40,000	1,200,000	\$735,682	\$	1,235,682

Kind of Field	Initial Cost	Annual Maintenance Cost	Annual Number of Events	Quality of Play	Cost per event Average over 10 yrs.
Standard Natural Turf w/ Irrigation	Moderate \$124,000 13.80/SY	Moderate \$15,000 + irrigation 1,300 + av. rebuild cost 250 \$16,550 (Rebuild field every 8 yrs. \$2,000)	Moderate 400 events	Very Good - needs ongoing maintenance	\$72.38
16" Sand-base w/ Natural Grass	High \$260,000 28.90/SY	Very High \$30,000 + irrigation 2,600 + av. rebuild cost 3,125 \$35,725 (Rebuild field every 8 yrs. \$25,000)	Low 60 - 120 events	Excellent - limited # of games, high maintenance	\$1,028.75 - 514.38 Note: sand-based fields also require special equipment not owned by Parks
Synthetic Grass w/ Sand/Rubber Tigard Sports Surfaces Field Turf	Very High \$473,500 52.61/SY	Low \$3,000 + rebuild cost 50 \$3,050 (Add infill material every 10 yrs. \$500) Lights \$10,000	Very High 800 events (1500 events - with lights)	Excellent - more like natural turf	\$63.00 (\$46.93 at lighted field w/ 1500 events)

COSTS FOR PERRANO SECTION 1998