

Stanley Park Lawn Bowling Club



GREENS TEAM LEADER BINDER

2020

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PREFACE

This binder was prepared using available resource materials and personal communications with expertise listed in the references section. Where contradictory information was encountered the common opinions/methods were included in this binder and adjusted to the limitations within Stanley Park Lawn Bowling greens structure, budget constraints, infrastructure, location, weather and climate.

1.0 GREENS

1.1 Background

Objectives & Outcomes

2020

The objectives and outcomes for greens care & maintenance for 2020 are:

- Maintain a healthy, safe and inclusive environment for our members.
- Grow and maintain healthy bent grass greens with durable roots to effectively compete with moss, other grass species and weeds.
- Fair, Firm, Flat and Fast greens for everyone to enjoy.
- Repair problem areas on the East Green with turf patches.
- Develop a standardized seasonal plan for Greens Care & Maintenance.
- Develop and implement standardized procedures for equipment preventative maintenance and repairs.
- Prioritize capital expenditures related to Greens Care & Maintenance and obtain competitive budget quotations for future planning.
- Explore the availability of electric/battery greens care machinery.
- Explore installation of a bent grass nursery for future greens repair patches.
- Maintain our specialized machinery in top condition, within budget constraints.
- Train greens volunteers in the proper use of a limited number of club garden machines, consumables and tools, frequently used by our greens volunteers.
- Create a succession plan for the Greens Team Leader and Shop Volunteers for machine maintenance.

3 Year

- Continue with the annual Greens Care & Maintenance plan as outlined in this binder to improve the quality of the greens within the limitations of the current greens structure, location, budget and available equipment.
- Improve training and awareness of all club members in Greens Care & Maintenance practices and challenges.
- Add new/replacement maintenance machinery including:
 - (1) reel mower, preferably electric/battery
 - (1) greens rotating brush, preferably electric/battery
 - (1) power rake, 1/32" tines, preferably electric/battery
 - Drag-along sand spreader compatible with the existing Craftsman tractor
- Upgrade the irrigation system to improve irrigation coverage and quality.
- Sale of the Eco250 Topdresser.
- Explore the use of LED programmable "grow lights" for high shade areas (solar powered).
- Improved outdoor security measures.

5 Year +

Items under consideration for Greens Care & Maintenance in the 5+ year time horizon include:

- New backboards/bankboards for each green.
- Explore replacement of the turf on both greens – West Green followed by the East. Green priority, including new drainage systems and integral drainage in the ditches.
- New lighting standards, including LED lights.
- A definitive discounted cashflow cost-benefit analysis of options for installing artificial greens compared to natural greens at SPLBC.

History, Weather & Climate

History

While the club is over 100 years old, the current greens were constructed for the 1954 Commonwealth Games held in Vancouver. Point Grey LBC had identical greens built at the same time. Our greens are soil based, which are more dense with less drainage capacity compared to sand greens. Our greens are about 12 to 14 inches deep with sand top dressing and herringbone clay tile drainage systems, at 2% grade, which drain to a storm drain located at the south end of the property near the central main gate. Most greens built since 1980 are 100% sand. Originally our greens were grown with *Poa annua* (bluegrass), which produce lumpy, slow greens, and which “chip” out easily from bowls impact due to short roots. The *Poa annua* has since been replaced over time with Penncross and Providence bent grass products, but persists in patches. Each of our two greens have dimensions of 125 ft x 125 ft, slightly larger than prescribed greens dimensions (112 feet), with area available for 8 bowling rinks on each green.

The backboards were re-faced with treated lumber in 2013 and asphalt surrounds added on the north perimeter and central median the same year. In 2016 Velcro strips were added to the backboards for lane markers, eliminating the potential hazards from protruding screws previously used to secure lane markers. The plinths on the West green were replaced in early 2020 due to wood rot. The plinths on the East green will require replacement as soon as funds are available.

The bare patches at chronically wet areas, under the central median tree shade and in the NE corner of the East green, have been replaced using bent grass turf patches which were installed by English Lawns. To date the patches have established good bent grass bowling greens in those locations. Long term mitigation by trimming/pruning the over-hanging trees might not be possible due to resistance by the Park Board to trim healthy trees. and therefore continued patching might be necessary in certain problem areas.

Weather

Weather is the day-to-day state of the atmosphere in a region and its short-term (minutes to weeks) variations. Weather is the combination of temperature, humidity, precipitation, cloudiness, visibility, and wind. Weather is determined by the movement of cold and warm fronts, wind patterns, mountains, oceans and elevation. Vancouver is noted for its numerous and localized weather variations. On any one day It can rain in North Vancouver but be dry in the West End. It can be hot in New Westminster and moderate at English Bay. The ground can be snow covered at the Little Mountain LBC but not at SPLBC.

Extreme weather events such as high winds and heavy rain have occasionally wreaked havoc in the West End. Before the Park Board upgraded its storm sewer system north of our property our clubhouse was not infrequently flooded. We do experience high winds 3 or 4 times a year which blow branches, sticky fir needles and pinecones onto the greens necessitating clean-ups.

Extremely violent winds like the 2006 wind shear that destroyed 5,000 trees in Stanley Park and destructive hurricanes in 1934 and 1962 are rare but potentially devastating.

In general, with good seed selection, guided fertilizing, careful watering and a regular maintenance plan, our greens can survive all but the rarest of current weather events.

Climate

Climate is the combined statistical weather information describing the variation of weather at a given place for an extended interval, usually 30 or more years.

Our recent past and present climate in the city of Vancouver is described as “moderate, west-coast oceanic” blending into Mediterranean. Summers are typically dry with July and August often being “moderate drought” months. October through March are typically rainy. Skies are often overcast. Snow and ice have not been significant factors at our location. Local mountains have typically received enough snowpack to supply the city with sufficient water during all but the most dry summers.

There has been some recent measurable increase in our minimum temperatures. Horticulturists describe the city of Vancouver as now lying in Plant Hardiness Zone 5a which is a change from Zone 4b just 30 years ago or an average minimum temperature increase of 5 degrees F. All our current greens grass seeds can thrive in either Zones 4 or 5.

Climate data for [Vancouver Harbour](#) CS (1971-2000)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °C (°F)	15.6 (60.1)	16.4 (61.5)	19.1 (66.4)	23.9 (75.0)	32.7 (90.9)	30.0 (86.0)	31.7 (89.1)	31.7 (89.1)	28.5 (83.3)	24.2 (75.6)	17.0 (62.6)	15.0 (59.0)	32.7 (90.9)
Average high °C (°F)	6.8 (44.2)	8.4 (47.1)	10.6 (51.1)	13.5 (56.3)	16.8 (62.2)	19.6 (67.3)	22.0 (71.6)	22.3 (72.1)	19.0 (66.2)	13.9 (57.0)	9.3 (48.7)	6.8 (44.2)	14.1 (57.4)
Daily mean °C (°F)	4.8 (40.6)	5.9 (42.6)	7.6 (45.7)	10.0 (50.0)	13.2 (55.8)	15.9 (60.6)	18.1 (64.6)	18.3 (64.9)	15.4 (59.7)	11.1 (52.0)	7.1 (44.8)	4.8 (40.6)	11.0 (51.8)
Average low °C (°F)	2.7 (36.9)	3.4 (38.1)	4.6 (40.3)	6.5 (43.7)	9.5 (49.1)	12.2 (54.0)	14.1 (57.4)	14.4 (57.9)	11.6 (52.9)	8.2 (46.8)	4.8 (40.6)	2.8 (37.0)	7.9 (46.2)
Record low °C (°F)	-13.3 (8.1)	-6.7 (19.9)	-5 (23)	-1.1 (30.0)	1.1 (34.0)	2.8 (37.0)	2.8 (37.0)	5.0 (41.0)	1.7 (35.1)	-3.2 (26.2)	-9.9 (14.2)	-15.6 (3.9)	-15.6 (3.9)
Average <u>precipitation</u> mm (inches)	178.8 (7.04)	183.8 (7.24)	155.8 (6.13)	117.9 (4.64)	86.7 (3.41)	69.9 (2.75)	53.4 (2.10)	50.8 (2.00)	73.3 (2.89)	147.8 (5.82)	239.2 (9.42)	231.3 (9.11)	1,588.6 (62.54)
Average rainfall mm (inches)	143.6 (5.65)	173.5 (6.83)	153.1 (6.03)	117.0 (4.61)	86.7 (3.41)	69.9 (2.75)	49.1 (1.93)	48.3 (1.90)	71.0 (2.80)	131.9 (5.19)	219.5 (8.64)	211.5 (8.33)	1,474.9 (58.07)
Average snowfall cm (inches)	15.3 (6.0)	10.2 (4.0)	2.7 (1.1)	0.9 (0.4)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	2.7 (1.1)	11.8 (4.6)	43.6 (17.2)
Average precipitation days (≥ 0.2 mm)	18.3	16.4	16.6	14.9	12.9	11.6	7.6	7.7	9.4	14.9	19.8	19.1	169.1
Average rainy days (≥ 0.2 mm)	14.8	16.3	15.9	14.2	13.2	10.7	7.6	7.7	9.8	12.0	16.8	16.2	154.5
Average snowy days (≥ 0.2 cm)	2.8	1.9	0.89	0.24	0.0	0.0	0.0	0.0	0.0	0.05	0.88	2.9	9.6
Mean monthly <u>sunshine</u> <u>hours</u>	51.1	79.6	124.7	161.3	222.8	223.5	276.8	256.6	178.3	127.3	66.9	49.6	1,818.4

Source 1: [Environment Canada](#)^[19]

Source 2: [Environment Canada](#) (sun, 1961–1990)^[20]

What will happen with climate change and when will we see the effects? Projections are that our area will experience wetter winters and warmer and drier summers with July and August becoming much more of a drought period. When this occurs depends on whether we see straight-line or exponential changes.

Metro Vancouver's Climate Projections Report (<http://www.metrovancouver.org/services/air-quality/AirQualityPublications/ClimateProjectionsForMetroVancouver.pdf>), **June 2016**, provides details of the projected impacts of climate change in this region, and in summary:

- Warmer temperatures: with increasing daytime and nighttime temperatures, there will be more hot summer days and fewer winter days with frost or ice.
- Longer summer dry spells: summer rainfall will decline by nearly 20%, with increased likelihood of extended drought periods.
- Wetter fall and winters: although on average the total annual rainfall is expected to increase by just 5%, there will be a large increase in rainfall during fall and winter.
- More extreme precipitation events: more rain will fall during the wettest days of the year and the frequency of extreme rainfall events will increase.
- Decreased snowpack: the deep spring snowpack in the mountainous watersheds is expected to decrease by over 50% compared to present day.
- Sea level rise: in addition to these weather-related changes predicted in our region, warming global temperature is projected to bring at least 1 metre of sea level rise by 2100, which will impact coastal communities in our region.

Longer term implications for extended summer droughts and less snowpack in the coastal mountains are likely strict restrictions on water use. Bowling greens can not be allowed to dry out in summer like residential lawns so we will have to consider more efficient and effective irrigation systems if we stick with natural grass greens. The cooling shade benefits of the two large trees on the median will be more important with hotter summers.

The expectation of more extreme weather events may give us cause for concern about the stability of the many trees on or near our property that if toppled could cause physical damage to the greens and buildings.

Tools & Terminology

Bowling

Aiming Line: An imaginary line the player aims along to allow for the bias of the bowl.

Back Bowl: A bowl that comes to rest beyond the Jack.

Backboard: the barrier at the end of the green, usually made of wood, after the ditch, also called the "Bank".

Backhand Draw: When the bowl is aimed to the left of the Jack, and curves to the right (for a right handed bowler).

Be Up: Instruction from Skip to bowl longer (don't be short of Jack).

Bias: Weighted offset to make the bowl curve. The bias side of the bowl is noted by the smaller symbol/logo. Bias is correct when the bowl curves towards the Jack.

Blocker: A bowl that blocks someone (usually an opponent) from reaching the desired target.

Bowls: the "almost round" balls we use to play the game.

Centre Line: Line marked at each end of the rink indicating the middle of the rink. The mat is placed on the centre line. After being rolled, the jack is also straightened to rest on the centre line.

Chalk: or chalk spray, used to mark the initial position of the jack and/or mark bowls that have touched the jack.

Dead End / Burned End: When the Jack has been knocked out of bounds. The end is not counted and is played again OR the jack is returned to the 2 meter line and play continues.

Draw Shot: The standard shot where players aim to deliver their bowl as close as possible to the jack or designated position, without causing too much disturbance to bowls already at the Head.

Drive: This involves bowling with considerable force with the aim of knocking either the Jack or a specific bowl(s) out of play.

Dead Bowl: When a bowl either goes into the ditch or rests outside the Rink field of play (Lane).

Delivery: the act of throwing/rolling a bowl.

Ditch: The "gutter" around the outside edge of the green, usually filled with sand.

Down: When your team does not have the Shot Bowl, you are considered to be Down. You may be down by one or more points.

End: Means playing of the Jack and all bowls of both opponents in the same direction on a Rink, and the score recorded. The number of Ends played is decided by Club Rules. A typical game has 14 ends in social games, 18 in tournaments.

Foot Fault: A foot fault occurs when the bowler does not have one foot over the mat on release of the bowl. Foot may be on the mat or in the air.

Forehand Draw: When the bowl is aimed to the right of the Jack, and curves to the left (for right-handed bowlers).

Fours: A game in which each team has 4 players on their team – a Skip, a Vice, a Second and a Lead. Typically each player then only uses 2 bowls each.

Game: playing a pre-agreed number of Ends.

Grass: Apart from the surface, the directional line the bowl takes in order for it to curve towards the Jack. So a “too much grass” bowl will be wide. Also used is the term “green”, too much “green” the bowl will be wide of the target.

Green: Lawn bowls is played on a square “Green” of grass, with directions being alternated daily to protect the grass. Normally 31 to 40 meters on each side, allowing for up to 8 rinks of play.

The Hammer: The final bowl of the end.

Hand: The side on which the Bowl is delivered: either Forehand or Backhand.

Head: Rolling bowls toward the Jack to build up a Head, surrounding the Jack, which means such bowls that have come to rest within the boundary of the Rink and have not been declared dead.

Heavy: When a Bowl is unintentionally delivered beyond the target. Also refers to a slow green.

Hog Line: Special markers (striped markers or often flags for tournaments) that dictate the minimum line beyond which the jack must be rolled for the end to be valid.

Holding Shot: Team with their bowl(s) closest to Jack (see also Shot Bowl).

Hook: Shape to the end some bowls take, especially older Classic bowls with extreme bias.

Jack: White ball or “kitty” used as a target to play to, which determines point scoring (see Points).

Jack High: If a bowl is Jack High it means it has reached a position where it is laterally aligned with the Jack. Effectively it means the Bowl and Jack are level.

Long Mat: a cloth or plastic mat, preferably permeable, approximately 4 feet by 8 feet, used to protect high wear, high foot traffic areas of the greens from damage from foot traffic, bowls “lofting” and /or wet weather.

Lead: The person who starts off the play. Also places the Mat and rolls the Jack if their team “has the mat”.

Live Bowl: A bowl that has come to rest within the boundaries of the Rink beyond a minimum distance. A bowl that has touched the jack and comes to rest in the Ditch or is knocked into the Ditch within the boundary markers of the Rink.

Mat: The actual mat that is placed by the team winning the last end, to start the next end. This is also known as having the Mat. The team with the mat always rolls the Jack.

Measure: When bowls are too close to visually decide which one is closer to the Jack, it is known as a measure. Players carry special lawn bowls tape measures to do this. The distance is irrelevant so the tapes are only used to see who is closest.

Narrow: Bowler didn't start out far enough from centreline to the Jack.

Pairs: Bowls games in which each team has a pair of players (a Skip and a Lead)

Plinth: the barrier, usually made of wood, at the end of a green before the ditch.

Points: Whoever gets their bowl(s) closest to Jack at conclusion of an End.

Point of Aim: A point on the aiming line where the bowler focuses during Delivery of the Bowl.

Potato Bowl: A badly thrown (or released) bowl that hops, skips and jumps.

Promoting a Bowl: Pushing up one of your team's Bowls, by contact with your Bowl, to a better position for scoring.

Rink: An individual Rink on the greens playing surface. Approximately 4.3 to 5.8 meters wide, but equal, from one end to the opposite end. Each Rink is defined by markers on the Backboards to clearly define each Rink. This way, multiple games can be played simultaneously on one Green. Bowls that come to rest out of their defined Rink are Dead Bowls and are removed from the end.

Second: in a game of Fours, the second player on each team to Deliver their Bowls.

Singles: A game in which each team has only 1 player. Each player then uses 4 bowls each.

Skip: Team captain or Skip who always plays last. This person guides the team's strategy and records the score of each end on the score card.

Shot Bowl: The bowl closest to the Jack.

Tie: When the two closest bowls are both exactly the same distance from the jack and belong to opposing teams, even after measurement, the end is declared a tie. (Note: Unlike old conservative English clubs, the men never ever wear ties at our club – not even for Xmas dinner!)

Touchers: Bowls that hit the Jack. These bowls are marked with Chalk and remain "alive" even if they are in the Ditch.

Trial Ends: Formal practice ends, usually only allowed at the start of a tournament, in which each team rolls 2 bowls, or more depending on tournament rules, down and back to get a feel of the green. Such ends do not count in the scoring.

Triples: A game in which each team has 3 players on their team – a Skip, a Vice and a Lead. Typically each player then only uses 3 bowls each.

Up: When your team does have the Shot Bowl, you are considered to be Up. You may be Up by one or more points.

Vice or Third: The person who plays after the Lead (or Second in a game of Fours) and is responsible for deciding the scoring of a Head, and posting the results on the scoreboard (the Skip records the results of each End on the score card, which is the official record of each game).

Weight: The amount of force/speed applied in Delivering the Bowl from the Mat to the Jack. “Heavy” weight means that the bowl stops beyond the Jack, while “Light” means that it stops short of the spot desired.

Wide: The bowl is started too far outside of the centreline to the Jack and comes to rest away from the centreline of the Jack on the same side as the release point (also called taking too much “Grass” or too much “Green”).

Wick: When a bowl bounces off another bowl (this term is derived from curling).

Woods: An old term for bowls.

Yard On: A shot delivered with an extra degree of speed to displace or disturb other bowls in the Head with intent of killing the End.

Greens Care & Maintenance

Bent Grass: see “Creeping Bent Grass”.

Coring: punching the greens with hollow core tines to remove plugs of the turf, used to improve aeration and drainage, usually in the Spring and Fall.

Creeping Bent Grass: the specialized varietal of grass we grow on the greens, which grows sideways, known for its “carpet-like” coverage.

Deep-seeding: using a deep-slit tine machine to create thin slits in the greens surface, ¼ to ½ inch deep, adding bent grass seed below the root zone, usually done in Spring and occasionally Fall if bare patches persist.

Dragging the greens: after top-dressing or over-seeding a heavy chain is dragged across the greens to work the sand and seed into the root zone.

Height-of-Cut (HOC): the height to which the grass on the greens is cut, varying with season and weather.

Over-seeding: is the process of planting grass seed into an existing lawn. This is done to improve the lawn's overall look and health, thicken the grass, minimize weeds, fill in bare or damaged areas, or convert to another type of lawn grass, often in combination with top-dressing, usually in the Spring and Fall.

Patching: yep, putting a patch on the greens – this can be done for small areas (less than 3 feet square) using a mix of sand, high organic soil, and seed, however, for larger areas it is recommended to plant new bent grass sod.

Spiking: punching the greens with solid tines to push holes into the turf, used to improve aeration and drainage, occasionally during the season as greens conditions warrant.

Surfactant or Wetting Agent: a liquid compound used to change the surface tension at the water/solid interface – it helps keep moisture in the root zone.

Top-dressing: Adding sand on top of the greens in the Spring and Fall, and occasionally on the perimeter of the greens to protect the grass.

Machines & Tools

Aerator: specialized machine used for Coring and Spiking.

Back-lapping: running the mower reel backwards, slowly, in the presence of a grinding compound to sharpen the bed knife, usually monthly.

Bed Knife: the long, sharp blade that is under the rotating mower reel, the grass is cut between the mower blade and the bed knife blade.

Edger: specialty machine for cutting a clean edge between the greens and the plinth.

Greens Brush or Dew Brush: about 4 to 6 feet across, a soft brush that looks like a large broom, used to brush the dew off the greens before play can begin in the morning.

Greens Iron: a motorized heavy rolls machine used to flatten the greens, and discourage growth of moss, fungi and *Poa annua*.

Lawn mower: same as a lawn mower 🌿

Leaf blower: same as a leaf blower 🌿, used to clear debris from the greens daily.

Power rake: a special machine with multiple rotating thin blades used to make 2 to 3 inch vertical cuts in the grass to improve aeration and drainage by removing thatch (also called verti-cutting or de-thatching)

Reel grinding: sharpening the blades on the Reel Mower, once or twice a season.

Reel Mower: a special lawn mower designed for golf greens and bowling greens with a multiple blade rotating reel.

String trimmer: same as a “weed-whacker”, used to trim around edges of the greens at the Plinth and around the grass verges surrounding the greens.

Top-Dresser: NOT the best-dressed club member!! A special machine that is used to spread sand evenly onto the greens, sometimes used for Over-seeding as well.

Important Contacts for Greens Team Leader (2020)

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Contractors:

Greenskeeper:

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Shop Volunteers:

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Mechanical/Maintenance Contractors:

Andrew Ranko (service/repairs)	778 896 7678	andyranko@gmail.com
Vlad Leshchynskyy (service/repairs)	604 313 7492 (cell)	604 980 9805 (shop)
AR Mower & Supply (service/parts)	604 940 1011	https://www.armower.com/
Oak Creek Golf & Turf (service/parts)	604 882 8399 (turf)	
	604 455 1555 (irrigation systems)	
West Coast Sprinklers – Philip	604 559 3704	contact@westcoastsprinklers.com

Greens Services/Suppliers:

Nick Broad (English Lawns)	604 220 5296	englishlawns@telus.net
John Sykes (BC InstantLawn)	604 454 4954	https://www.bcinstantlawns.com/
Bert Bos (Bos Sod)	604 854 1415	https://www.bossod.com/
	604 217 0818	
Pat Differ (deep-seeding, coring)		patdiffer@gmail.com
Doug Speranza (top dressing sand)	604 209 7418	extremeturf@shaw.ca
David Arnott (Kerrisdale LBC)	604 228 1318	dkamarketing@shaw.ca
Target Products (sand supplier)	604 444 3620	kgowan@quikrete.ca
		https://www.targetproducts.com/
Taylor's Turf Care (seed, fertilizer)	604 552 3960	https://www.turfandrec.com/
Keso Turf Supplies (fertilizer, surfactant)	604 940 2240	https://www.kesoturfsupplies.com/

Park Board:

Tim Collins - Manager	604 257 8437	tim.collins@vancouver.ca
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1.2 Basics of Bent Grass Care & Maintenance

Types of Bent Grass

Native to Asia and Europe, there are three primary types of bent grass: Colonial, Velvet and Creeping. Creeping bentgrass is preferable for golf and bowling greens. Bent grass spreads by stolens which connect and root at internodes. The dense mat it produces has shallow roots and fine bluish green foliage. This makes it an attractive and resilient turfgrass, for lawns, golf greens and bowling greens, able to withstand foot traffic and frequent mowing.

The creeping bent grass variety we use at SPLBC is a GMO transgenic product that is cultivated widely in Oregon, for turf supply and seed supply. In nature bent grass is self-fertilizing, from leaf and root decay by microorganisms. For our bowling greens we require fertilizers and additives to create healthy, durable bent grass bowling greens.

Healthy bent grass does not go brown in hot weather unless there is an irrigation problem or a disease issue. If it is brown any other time of year it is NOT bent grass.

Types of competitor grass, moss, fungi, algae, weeds and other

Competitor Grass/Plants

The main competitors to our bent grass at SPLBC are Poa Annuua (annual bluegrass or annual meadow grass), Perennial ryegrass (planted by us years ago), and *cotula dioica* or hairless leptinella “Minima” (imported by us from New Zealand years ago).

Poa Annuua is lighter green than bent grass and is very aggressive, considered a weed, and thrives in the same conditions as bent grass. It has shallow roots and therefore is not drought resistant and is easily damaged or “chipped” by errant bowls – resulting in brown, patchy, irregular playing surfaces. In addition, Poa Annuua will go dormant or die off in hot weather, turn brown, and cause an uneven playing surface. Poa annua might be reduced by application of a pre-emergent herbicide, applied in late summer or early fall, and frequent verticutting/rolling early in the season. In addition, infrequent watering to promote long root structures in competing creeping bent grass will help select against Poa Annuua.

Perennial ryegrass is dark green and more coarse than our creeping bent grass variety and is slowly being displaced from our greens as we grow better creeping bent grass quality and cover.

Like Poa Annuua, *cotula dioica* thrives in the same conditions as bent grass and has a slight yellow hue. Leave the cotula alone. The exact coverage of the cotula will vary over the years. Long, deep frosts can seem to wipe it out completely and then it starts to re-appear (this is the reason cotula has been replaced locally by new varieties of creeping bent grass in more recent years). A long period with no frost penetration below the roots results in large areas of cotula

re-establishing. If we remove the entire green and start again, we can remove the cotula. Otherwise, it is like moss and fungus, it will always be present. The good news is that cotula is actually a fast surface to bowl on, especially when wet, and it is not prone to disease (especially moss) or chipping from player traffic. The bad news is that it will almost never be the only plant in our greens, so some speed changes will occur between plant species.

All of these competing grass/plant species create “lumpy” or “clumpy” greens which cause our bowls to change direction occasionally, and quite by surprise.

Moss

Moss is an ongoing condition at SPLBC – moss particularly favours high moisture, low oxygen, low light and acidic pH. When the moss dies it can leave bare patches on the greens. We can combat moss with: iron (either ferrous sulphate or ferrous ammonium sulphate in the fertilizer product we use), **and consistent mowing year-round, verti-cutting to improve drainage and aeration, frequent rolling, light sanding in the fall, and dolomitic lime application in the fall.** Having our Greenskeeper active during the winter months is important to control moss and *Poa annua*.

Fungi

Fungi do not contain chlorophyll so they are not green. The most common fungi we encounter at SPLBC are fusarium and fusarium blight, which can be controlled using a standard fungicide product. We also encounter a variety of other spore-forming fungi that are natural to our climate, including mushrooms, all of which can be minimized by application of fungicides and by encouraging bent grass growth and strong bent grass roots.

Algae

Although they do not infect grasses, blue-green algae are a significant “pest” problem in the turfgrass industry. These organisms contain chlorophyll just like plants, but they grow by producing chains of thread-like cells similar to fungi. That is, there is no root zone. Symptoms of algae appear in areas where the turf canopy has been thinned by poor growing conditions, mower damage, wear or other pest activity. In these areas, a dark green or black mat of fuzzy growth is evident in the turf canopy or on the surface of the thatch. During periods of dry weather, this algal growth forms a dry, cracking crust on the thatch surface that repels water and impedes turf recovery. Frequent verti-cutting and rolling are important to discourage algal growth.

Algal growth is most aggressive during the late spring, summer, and early fall when warm, humid conditions are conducive to algae growth and turf thinning. **Low mowing heights, shady conditions, poor soil drainage, and frequent irrigation also encourage algal growth in the turf canopy. Maintenance of dense, healthy bent grass is the most effective way to prevent algae invasions (consistent mowing, aeration, verti-cutting for thatch removal and rolling).** Avoid establishing turf in areas that are heavily shaded or poorly drained or take steps to correct these problems in established turf locations. Mow at the recommended height for each bent grass species, and increase mowing heights in shady areas to compensate for the reduced light levels. Irrigation should be applied deeply and infrequently; apply sufficient water to wet the entire root zone, and then reapply as needed when the turf shows signs of wilt. Greens,

especially high traffic areas, must be cultivated regularly to maintain soil drainage and aerated periodically, depending on compaction, to prevent algae growth.

Most chemical treatments used to control algae also impede bent grass health – best to maintain a green in conditions that don't favour algae growth in the first place. Once a severe algae infestation has occurred, fungicide applications alone will not provide acceptable control. Additional steps must be taken to physically break-up the mat of algal growth so that the turf can recover. Spiking, aeration, verti-cutting, topdressing, or combinations thereof are effective ways to accomplish this.

Weeds

It is best to reduce the incidence of weeds, usually broad-leafed plants, in a bowling green without the use of chemical herbicides. Conditions that can help control weed establishment and growth include:

- Healthy turf cover with consistent thatch control,
- Do not over-fertilize,
- Keep weeds out of surrounding lawns/verges, and
- Remove weeds by mechanical means, early in their growth (pen knife, garden spoon).

Growing and Maintaining Durable Bowling Greens

Mowing

Mowing is the single most important activity for healthy, durable bowling greens. Our Greenskeeper is responsible for all mowing operations on the greens. The frequency of mowing is slowly increased in the Spring to prepare for the bowling season and the greens should be mowed a minimum of 3 times per week during the bowling season, and more often for tournament play.

Always cut on a diagonal to the bowling direction of play during the bowling season. A double-cut in the opposite diagonal (90 degrees) is effective to produce fast greens and essential for tournament play. To protect the edges of the greens from undue wear from the mower turn radius it is helpful to mow 1, 2 or 3 mower widths parallel to the plinth before starting the diagonal pattern. The number of perimeter cuts can be varied each time a green is cut, to avoid any wear areas caused by repetitive mower actions.

Mower height-of-cut (HOC) will vary through the season (see Section 1.3) and the shortest cut will be determined by bent grass type, location, climate, weather, greens traffic, greens condition, competing plants and tournament play. Greens firmness varies with the seasons, rainfall and bowling activity – these variables must be considered when setting the HOC in the shop. The HOC should be changed slowly, either higher or lower, to avoid abrupt HOC changes and potential greens damage. In general, HOC guidelines for each season are as follows:

SPLBC Greens Mower Height of Cut Conversion

		inches	decimal	mm	
	March	5/16"	0.3125	8	
	April	1/4"	0.2500	6	
	April	7/32"	0.2188	6	B
	May	7/32"	0.2188	6	O
	June	7/32"	0.2188	6	W
	July	7/32"	0.2188	6	L
H	July	3/16"	0.1875	5	I
O	August	3/16"	0.1875	5	N
T	September	3/16"	0.1875	5	G
	September	1/4"	0.2500	6	
	October	5/16"	0.3125	8	
	Winter	3/8"	0.3750	10	

NOTE: Mower HOC can be raised by 1/16" or 3/32" for: areas that have frequent shade and/or new areas of bent grass growth (patches) as well as [the first 2 meters around the perimeter during the bowling season.](#)

Mowing should be followed by rolling at a minimum of once per week until the hot, dry weather of summer firms the greens to a point where frequent rolling could damage the greens (mid-July and August).

Mower mechanical condition is very important to maintain consistent cutting and avoid bruising or ripping the bent grass structure (see Section 2.3), which could cause bare spots and/or disease on the greens. If there are multiple mowers available it is prudent to keep one mower aside for "heavy-duty" use after coring/top-dressing in the Spring and Fall, with appropriate timing for mower reel blade sharpening and bed knife replacement staggered between the mowers.

Rolling (Greens “Ironing”)

There are many differing opinions about rolling, or ironing, lawn bowling greens. In the Pacific Northwest some of the benefits of rolling include:

- Faster greens with a higher height of cut for better bent grass health,
- Disrupts moss and bluegrass (*Poa annua*) growth,
- Used in combination with verti-cutting, which disrupts moss and *Poa annua* growth (both plants grow sideways), maintains greens speed,
- Reduced opportunity for fungus growth,
- More consistent greens speed and level.

We have an excellent greens “iron” at SPLBC which is used by our Greenskeeper and by volunteers under supervision if needed. Consensus among local area bowling clubs is frequent rolling, alternating days between mowing days, during the bowling season will maintain fast greens while allowing simultaneous healthy bent grass growth at a slightly higher HOC, which promotes deeper root growth. Rolling can be reduced during hot, dry periods when the greens are stressed. If frequent rolling is employed for faster greens then greens spiking with solid pencil tines (1/4” diameter) should also be considered monthly, depending on greens conditions, to maintain root aeration and adequate greens drainage (see “Aeration”, below).

Rolling can be used following verti-cutting, to ensure a smooth playing surface while maintaining the advantages of shallow aeration and thatch removal using the verti-cutter.

Aeration

Air in the root zone is essential to provide oxygen and nitrogen for plant growth and growth of microorganisms that fix nutrients for plant growth. Aeration can be accomplished using a number of tools: de-thatching (verti-cutting), coring, spiking and deep-slit tining.

At SPLBC we have an aerator machine, operated by the Greenskeeper, that can be fitted with hollow core tines, to remove “plugs” and allow good air flow, or solid “pencil” tines for spiking the greens. Ideally hollow core aeration with small diameter tines (3/16” or 1/4”) is done in the Spring, prior to the first Spring fertilizer application and prior to top-dressing and over-seeding. In addition, hollow coring is done in the Fall immediately after the bowling season, using larger diameter tines, up to 1/2” diameter core, if the greens are very hard and compacted, in combination with top-dressing and over-seeding, allowing 6 weeks of growing season remaining for new bent grass growth. Recommended core size ranges from 3/16” to 1/2”, depending on greens condition – smaller cores in the Spring is preferred just prior to the bowling season.

Spiking can be done monthly during the bowling season, to maintain good root aeration, especially around high wear areas of the greens (first 2 meters from the Plinth) and if frequent rolling is used to improve the greens speed. Spiking can interrupt bowling temporarily, allow one day after spiking/rolling to resume play, so it is important to plan around club events.

Recommended spike diameter is 3/16" to 1/4" depending on greens conditions and bowling activities.

Deep-slit tining is a specialised machine, often used in combination with deep-seeding in the Spring to improve seed germination; it is similar to verti-cutting, but a deeper blade cut (approximately 6 to 8 inches). Deep-slit tining is an effective aeration and drainage method with minimum disturbance to the greens and can also be used monthly from October until March during cool, wet weather to combat moss, algae and weed growth.

Top Dressing & Levelling

Top dressing with sand is used to dilute the top 2 to 3 centimeters of the greens and prevent the build up of thatch and is also used to fill spike or hollow core holes to bring sand to the root zone, all of which improves greens aeration and drainage as well as provide an opportunity to level the greens twice each year (fill low spots). The top-dressing machine owned by the club can be operated by the Greenskeeper or by volunteers under supervision. It is important to use a washed, graded sand product (0.6 mm to 1.0 mm maximum particle diameter) to ensure good drainage. At SPLBC we use approximately 4 to 5 tonnes of sand for each green after core aeration and 2 to 3 tonnes for each green after solid tine aeration or spiking.

Many clubs add bent grass seed to the top-dressing sand, called "over-seeding", to coincide with the hollow core aeration or periodic spiking to promote new bent grass growth and control moss and competing grass types.

Light top dressing can be used periodically around the playing heads (about 1 kg sand/m²); once a month is reasonable, to protect the bent grass in high traffic areas.

Verti-cutting or De-thatching

Sometimes called "scarifying" (UK), thatch removal is important for greens health and bowling speed. Thatch is an accumulation of dead or dying organic material (bent grass leaves and roots, other competitive plants, weeds, bird droppings, worm castings). Thatch occurs in the first 2 to 3 cm or so of the turf and must be removed to allow bent grass growth and improve turf aeration and drainage (which helps restrain moss and *Poa annua* growth). Thatch can be identified if a bowl leaves a "track" behind after it is delivered. Thatch also retains water, which is a preferred habitat for moss, insects and fungus and reduces airflow into the root zone.

Verti-cutting is accomplished at SPLBC using a power rake with vertically rotating thin blades, which open up the turf to improve air flow and drainage, and leave a 1 to 2 inch deep cut into the turf. The power rake is operated by the Greenskeeper. Frequent verti-cutting (weekly), followed by rolling, is important early in the bowling season, just after the greens have been aerated and the first fertilizer has been applied (which increases thatch), when the greens are softer and frequent rains demand better greens drainage. Verti-cutting frequency can be reduced to twice a month during May and June if there are no obvious thatch issues, then

reduced again, or possibly eliminated, in the hot dry months of summer (when the bent grass is stressed). Rolling with the greens “iron” after vert-cutting increase the speed of the green.

There is a considerable range between bowling clubs on the use of verti-cutting and frequency, often determined by budget constraints and/or dependence on outside contractors with the proper machine.

There is no need to mow the greens before verti-cutting. Verti-cutting follows the same pattern on the greens as the mower, including perimeter cutting parallel to the plinths. After April, or the start of bowling if earlier than the end of April, STOP verti-cutting the first 2 to 3 meters from the plinths. The vertical marks left after verti-cutting will remain visible for several days (important when planning tournament greens).

Patches and a Greens Nursery

Occasionally area patches will be required to repair greens damage. To date we have used outside contractors to supply and install the bent grass patches on both greens. Large area patching is normally scheduled in March and requires a minimum of 90 days growing before foot traffic is allowed. Occasional small area patches (less than 3 feet square) can be accomplished using a 65% sand/35% soil/bent grass seed and fertilizer mix, preferably by the Greenskeeper, as required. Patches, of any size, must be managed carefully in the first 30 to 60 days – to maintain constant root zone moisture and nutrient without over-watering. Twice daily hand-watering and a moisture meter are recommended for proper moisture control (approximately 5 to 10% moisture at 5 to 6 cm depth following irrigation), and nutrient addition coordinated with the Greenskeeper (Note: the sod for the patches comes from the supplier with high nutrient levels already established in the root zone).

Under consideration at SPLBC is the development of a bent grass nursery located at the club to supply healthy bent grass as required for greens patches. Considerations for a bent grass nursery include:

- Location and size, preferably 200 sq ft or more,
- Adequate natural drainage and sunlight,
- Substrate construction for nursery area drainage (tiles, graded gravel and sand),
- 100% sand base construction,
- Payback of the initial sod investment, per square foot of patch material available, if the nursery is not started using sand/soil/seed only,
- Additional time required for the Greenskeeper to maintain the nursery under the same conditions as the greens.

Irrigation

Irrigation in the Pacific Northwest is a fine balance between too much and too little water. Too much water too often is the perfect habitat for moss, *Poa annua* and fungus. It is important to ensure the root zone maintains sufficient moisture for plant growth, **4 to 5% moisture at 6 cm depth**, without drowning the bent grass. To promote durable root growth the recommended practice is for infrequent watering for longer periods to provide detectable moisture down to 25 cm depth and at the same time maintain minimum moisture levels at 4 to 6 cm depth of approximately 5% soil moisture within 1 hour of watering.

The frequency of irrigation depends on the type of grass, the soil's physical properties, and the climate conditions - especially rainfall, humidity, temperature, and wind movement. Many turfgrass problems may be attributed to improper watering. Perhaps one of the most important factors contributing to improper watering is frequent irrigation—watering too often.

Generally, the time to apply deep moisture is just as the grass plants begin to wilt, this could become a rule of thumb for watering the greens, with two possible exceptions:

Exception 1 - The first exception to infrequent, deep-watering is on newly seeded areas or patches which must be kept moist during the period the seed is germinating and seedlings are becoming established (2 to 3 months).

Exception 2 - It's an obvious one – when it gets really hot and the bent grass is being burned (mid-July and August). **Irrigation should then be moved to a frequent watering schedule, but less water each time (do not flood the green); for example:**

- **First irrigation event: 6 to 7am as the day begins to warm**
- **Second irrigation event: at about 4 to 4:30pm (to cool the grass shoots only).**
- **Final irrigation event: after 10 pm and before midnight.**

IF THERE ARE BROWN PATCHES DEVELOPING DURING HOT, DRY WEATHER – INCREASE THE FREQUENCY OF IRRIGATION BUT REDUCE THE AMOUNT OF WATER FOR EACH IRRIGATION EVENT - BE CAREFUL NOT TO OVER-IRRIGATE

Frequent, shallow watering tends to keep the upper layers of soil near a point of saturation most of the time. This causes shallow rooting and promotes weak turf which is susceptible to disease (moss, algae and fungi) and insect attack as well as damage from foot traffic. The practice of watering deeply only when grass plants show signs of wilting is for most bent grass a practical approach to a sound watering program and it is a big step forward in the development of healthy, vigorous greens with deep durable roots. Far too many bowling greens are watered too frequently and for too short a time. Late evening watering is preferred as it is less disruptive to bowling activities and also takes advantage of lower evaporation rates. Occasional light surface watering during very hot weather to cool the bent grass shoots, not the root zone, can minimize plant damage due to heat.

Our irrigation water is sourced from the City water system and is delivered at approximately 130 psig line pressure. We have 8 automated sprinkler heads at SPLBC – 4 for each green,

located at the 4 corners of each green, all controlled from a central panel located in the greens equipment shed. The sprinkler heads were tested, repaired and calibrated in Spring 2020 by West Coast Sprinklers. Due to the variability in sprinkler heads and location, the automated irrigation system is not perfect or particularly dependable and leaves dry spots if we avoid over-watering – **the automated irrigation system must be augmented by hand-watering certain areas as required.**

The combination of variable weather, shade and drainage areas at SPLBC dictates that our automated irrigation system be carefully managed and include hand watering as required. **It is preferable to leave the automated watering system control in the hands of our Greenskeeper,** who is also managing other aspects of the greens care including fertilizers and additives (which interact with irrigation). The Greenskeeper can then request volunteer input from the Greens Team Leader as required for hand watering certain areas and/or occasional modification to the automated timer if required.

A soil moisture meter is now available at SPLBC and a weekly grid measurement of moisture levels at 4 to 6 cm depth (root zone) can be conducted by the Greenskeeper, or by volunteers and reported to the Greenskeeper, and more frequently during hot, dry weather. The irrigation plan can then be modified as required to maintain adequate root moisture without over-watering to promote durable root growth.

Seed

Bent grass seed is purchased twice a year in 25 lb buckets. Each bucket contains enough seed to deep-seed or over-seed both greens and provide spare seed for patching and filling holes.

Important: bent grass seed sourced from Oregon has a 6 month half-life, that is, after 6 months from the date of harvest by the supplier only 1/2 of the seed will germinate.

In the Spring and Fall it is helpful to over-seed in combination with top-dressing sand OR deep-seed with an outside contractor (imbed seed ¼ to ½ inch deep) to maintain healthy new bent grass growth to combat moss, competing grass and weed growth. Approximately 10 to 12 lbs of seed for each green at each application.

Fertilizers and Additives

Fertilizers – our Greenskeeper manages the fertilizer applications, as well as type of fertilizer as the seasons change. The Greenskeeper extracts core samples around each green in March to assay for critical nutrients and adjust fertilizer planning as required. Typically, we are fertilizing once or twice per month during the growing season (March to October). NOTE: fertilizer over-stimulates plant growth, which creates more thatch = verti-cutting required to manage thatch.

A common recommendation for fertilizer applications is: to start the season use high organic matter slow release fertilizers with high Nitrogen, Phosphate and Potassium (N-P-K) content; for example 20-10-10. A fine-grained fertilizer containing slow-release nitrogen is preferred at a rate of 1 pound N per 1,000 sqft per month of growing season (5-6 lbs/1,000 sqft total addition over the season). It is important to keep track of total N-P-K addition per unit area of greens (in lbs or kg per sqft or m²) and total weight added, to compare with the core assays from the March core samples. During the season the phosphorous in the fertilizer can be reduced: 18-3-18, 19-2-19 or 20-0-20, as Nitrogen (N) and Potassium (K) wash out of the root zone quickly with rain/irrigation but phosphorous does not.

Frequency of fertilizer application is impacted by many factors, including weather. As a general rule, more frequent applications in small doses is preferred (eg twice a month during the bowling season). Nitrogen can be augmented during the season with quick release fertilizers such as 20-0-0, as required. **NOTE: nitrogen contributes to thatch production, therefore more fertilizer = more verti-cutting.** The amount of phosphorous in the fertilizer can be reduced during the season, but augmented by light additions of a high-Phosphorous liquid product as required. Liquid fertilizers are effective during the season as they are fast-acting, but require more frequent application.

Recommended fertilizer for the fall application, prior to over-seeding, is 12-2-24 or similar grade granular, slow release fertilizer product.

Taking core samples for assay in late June or early July is a good practice to verify nutrient loading, if budgets allow or if there is some question about greens nutrition.

Additives - our most common additive used is dolomitic lime, and application is managed by the Greenskeeper as required for pH control, based on annual core assays and periodic pH grid sampling with a hand-held meter. Other additives include: sulphate sources to reduce pH, iron sources to control moss, and specific minor or micronutrient additives to adjust the soil chemistry within preferred ranges, such as magnesium, calcium, manganese, zinc, copper and boron.

Note: the City water used for irrigation arrives at a pH of approximately 7.5 and is buffered with soda ash (sodium carbonate). Soil pH should be monitored regularly during irrigation season and sulphate applied as required to maintain the soil pH at approximately 6.5 to 6.7.

Fertilizer and Additives are normally applied by the Greenskeeper using a rotary spreader for even distribution or as a liquid application using a sprayer apparatus. Fertilizer and Additive specifications can be adjusted as required during the season by the Greenskeeper as indicated from a turf/nutrient consultant report and/or from core sample assays. Fertilizer and Additive applications are followed immediately by irrigation, to prevent surface burning as well as distribute the nutrients to the root zone.

Additional details on fertilizer application, including example core assay assessments, are included in References (3), (5) and (6) noted in Section 4.

Debris and Greens Cleaning

The greens are constantly under attack from un-wanted sources of debris: leaves, pine needles, seed pods from trees, worm castings, bird poop, and grass cuttings. The only way to deal with debris is frequent clearing from the greens, every 24 hours preferably, which can include sweeping, brushing and use of a leaf blower. A rotating greens brush is the most effective means of debris removal but we do not have this kind of machine at SPLBC at this time.

Pests

Pests that can negatively impact our greens health come in several forms, along with appropriate mitigation measures, and include:

- Crows – often seen landing on the greens and digging for grubs, leaving a gapping hole in the greens, which should be repaired as soon as possible: remove any bits of turf left behind by the crow and fill the hole with the Crow Hole Mix (bucket located in the bowling shed), tamp down firmly and even with the greens level, then add a small amount of water on top. **Crow Hole Mix** (20L bucket): Mix together 30% organic soil, 70% graded sand, 250mL starter fertilizer (20-10-10 or equivalent) and 250 mL new bent grass seed.
- Moles – we generally don't see mole holes in the greens but they are present under the greens and can create weak/soft spots, channels, mounds, and ridges in our greens. Frequent verti-cutting (1 to 3 inches below the surface) and frequent rolling will discourage the moles from setting up shop under our greens (a reason to continue these practices in winter).
- Geese – occasionally an issue, especially in the spring with new grass growth when the grass is not as closely cut. Goose poop can damage our greens in localized spots unless removed quickly. A known deterrent for geese is a life-size “wolf”, made of wood and mounted on a post so that it moves in the wind.
- Insects (notably beetles and ants) - we use a number of insect deterrents that are mostly petroleum derivatives and toxic to humans in large doses or if ingested. **Read the labels before applying any chemical insect deterrent products!!!**

Chemicals

Our most common chemicals used, other than fertilizers and insect treatments noted above, are fungicide/herbicide products and surfactants:

Fungicides – added regularly to control fungus growth (fusarium, mushrooms), also managed by the Greenskeeper. It is important to add a fungicide in the Fall (October or early November) to impede fungus growth during the winter.

Herbicides - we might use chemical herbicide products on the grass verges and in our gardens to control weed growth, and possible weed tracking onto our greens, **but not directly on the greens as chemical herbicides also kill creeping bent grass.**

Surfactant, or wetting agent – a surfactant modifies the surface tension at the water/solid interface. These products are added regularly during the bowling season by the Greenskeeper, usually by a spray applicator, to provide even surface tension and moisture retention in the root zone. This is also helpful for moss control.

Park Board – occasionally the Park Board applies a chemical treatment at our club, for some specific plant, insect or animal issue they are dealing with park-wide, such as the Japanese Beetle, which could require a range of chemical formulae. The Park Board will advise the club of any program that might affect our club and any potential hazards to our members or greens.

Chemicals that immediately kill bent grass, leaving a scar on the green, include: gasoline, petroleum grease products, strong acid or base (caustic) cleaners, concentrated fertilizer products, urine, certain foods, and Coca-Cola/Pepsi.

SAFETY NOTE: The presence of chemicals, and possibly bird poop, on our greens is the reason we have always encouraged all bowlers to wash their hands frequently during and after bowling, and to clean their bowls after each use.

Rink Management – Best Practices SPLBC

In general, rink management is about common sense around protecting the health of the greens for long term durability. **Protection of the greens is the responsibility and in the best interest of every member of the bowling club – a message that must be constantly emphasized with the members.**

Greens Rotation and Rink Selection

Rotating the direction of play on each green, from East-West to North-South, once each week is considered adequate measure to avoid wear patterns on the greens in one direction, subject to weather conditions. With frequent wet weather the greens rotation schedule should be accelerated, possibly daily in extreme cases. In addition, each rink can be moved daily, to one side or the other, to minimize wear patterns from foot traffic on each rink. In addition, the placement of the Mat should be changed frequently during a game to avoid traffic-wear in one spot on each rink. Velcro tabs located on the backboards, for rink markers, make rink selection and positioning relatively simple at SPLBC.

Rink selection and greens rotation are dependent on a number of variables and ultimately must be managed by the Greens Team Leader in cooperation with the Greenskeeper and Games Leader.

Rest rotation

Many clubs “rest” the greens regularly, notably after special events with large groups and/or tournaments. The more “rest” the greens receive between bowling activities the healthier they will grow. **A reasonable guideline is to rest the greens, by greens rotation and rink selection, approximately 1/3 to 1/2 of the available bowling time (this does not include 9pm to 9am).** In addition, it is important to avoid all-day bowling whenever possible (morning, afternoon and evening sessions).

Traffic management and damage control

The areas most at risk from high foot traffic are the perimeter areas, within 2 meters of the Plinths, and at the corners of the greens. Methods to protect the greens from traffic and damage:

- Strict instructions to members on proper protocol around greens management and traffic wear,
- Frequent relocation of the bowling Mat during each game,
- Training members to avoid “lofting” the bowls, which causes immediate chipping damage which is difficult to repair at certain times in the season,
- Use of “bowl launchers” to assist members who are unable to bend down to deliver the bowl without “lofting”,
- Traffic cones, or other barriers, to indicate areas where no foot traffic is permitted,
- Long mats (see separate section below).

Rain, Dew, Frost and Snow

The greens are easily damaged by foot traffic and “chipping” from bowls if they are wet – during rain, or within 4 hours of rain, and from morning dew. If possible, it is best to leave the greens rest for a minimum of 4 hours following a rain event, to ensure the first 1-3 cm depth have been properly drained. High thatch content can contribute to surface layer moisture long after a rain event, however, thatch should be minimized using the guidelines presented in this binder.

Dew control is important each morning before bowling, and is removed using the greens brush (see **Appendix AA, Volunteer Task Descriptions**). Walking on wet grass can damage the grass roots. In wet conditions the greens are prone to disease, notably fungi and moss. Dew can be particularly heavy in the hotter months: July, August and September.

If there is frost or snow on the greens: DO NOT WALK !! walking on frozen turf can severely damage the dormant grass plants.

Long mat use

Generally, greenskeepers and managers would prefer not to use long mats to protect the greens from damage, ever, due to restrictions to light and air exchange on the greens (the #1 and #2 most important things for greens health). However, there are occasions when the use of long mats is important to maintain the health of the greens, which outweighs the possible damage the mats could cause:

- During coaching clinics or club events for first-time bowlers,
- For corporate events where few, if any, of the participants has bowled before,
- When large club groups, more than 100, gather for a bowling event,
- If there is an area(s) where there is a new turf patch (within 3 to 6 months of installation),
- If the greens must be used **within 4 to 6 hours** after rainfall or irrigation,
- To protect damaged areas of the greens during bowling.

The positioning of the long mats is preferably at the 2 meter mark and beyond, however, on many occasions where there is potential for greens damage between the plinth and the 2 meter mark the mats can be placed close to the plinth. At times the long mats might only be needed on certain rinks or certain damaged areas, which is at the discretion of the Greens Team Leader.

Again, protection of the greens is the responsibility and in the best interest of every member of the bowling club – a message that must be constantly emphasized with the members.

1.3 SPLBC - Typical Seasonal Greens Maintenance Practice

Greens Challenges at SPLBC

We have chronic challenges to maintain healthy greens at SPLBC, which include items in the following summary. Each of the “Challenges” and “Impacts” are stand-alone statements, while the “Mitigation Dashboard” relates to each line item under the “Mitigation Measures” heading:

SPLBC – CHALLENGES FOR HEALTHY GREENS 2020

Good
 Better
 Poor
 Not Available

Rank	Description of Challenge	Impacts on Greens	Mitigation Measures	Mitigation Dashboard
1	Compaction, high-traffic	- Destroys grass and roots - Difficult to irrigate consistently - Susceptible to disease, competition - No rest period for root repair - Compacted bare spots	- Implement rest periods for each green - Hand watering as required - Adjust HOC on perimeter, patches - Use of long mats (prevention) - Use of long mats (protection) - Increased aeration (spiking, punching) - Minimize corporate events - Reduce club scheduled events - Light sanding on high traffic areas	
2	Different grass varieties: competing plants, moss and fungi	- Varying response to cultivation, weather and treatments	- Stay on set plan every year - Select conditions best for bent grass - Focused winter activities - Response to change in irrigation needs	
3	Irrigation: poor coverage, drop size, ideal: 4 to 5% moisture at 3 to 6 cm	- Poor control over moisture at roots - Variable wet and dry zones - Potential grass kill in patches - Favour competing plants	- Optimize sprinkler heads and spray cover - Optimize irrigation schedule - Improve hand watering frequency	
4	Trees	- Debris on greens - stunts growth - Shade – poor light/moisture control - Over-hang dripline – local damage	- Tree pruning - Greens brush - Long mat protection - Frequent debris removal - Grow lights in shade areas	
5	Bowling on wet greens	- Damage to root zone - Possible bent grass kill/bare spots	- No bowling - within 4-6 hours of rain - Long mats to protect wet areas	

General Practices (all year round):

- Bent grass needs light, air (nitrogen and oxygen), cutting, rolling, sand, water and nutrient, in that order.
- If we create the best environment for bent grass growth and durable roots, as described in this manual, nothing bad should grow.
- Repair small holes in the green using sand/soil/seed mix rather than turf strips. Nothing good will grow in a hole (fungus, mould, moss).

- Repair larger damaged areas with fresh bent grass sod (no more than 72 hours after harvest)
- Never let weeds cover up the turf. Cut them out with a pen knife or gardening spoon.
- Never use chemical treatments for weed control, they will also damage the bent grass.
- Chemicals are used for pH control, moss and fungus control, and certain pests.
- Remove all fall, winter and spring windfalls of leaves within 24 hours of occurrence.
- Always remove morning dew from the greens before walking on the greens.

Winter (January to early March):

- Mow every 2 weeks through the winter, if weather allows. Height of cut 5/16" to 3/8" (0.3125" to 0.375"). Horizontal cutting can be mixed with diagonal cutting in winter.
- Roll the greens regularly to remove dew/moisture and restrain fungus and moss growth, as the weather allows.
- A light top sanding applied in February, if no snow or frost, can assist with moss control.
- Avoid all activity on the greens during frost or snow.
- Treat with dolomitic lime in February, if necessary, to raise pH (pH 6.2 to 6.8 is desirable for early grass growth). If pH is too high (above 7) add mineralized Sulphur to adjust pH down. Note: iron is a good deterrent to moss growth while sulphate is an active form of Sulphur to reduce pH – an iron sulphate product is effective in early spring for moss control AND pH adjustment – often incorporated into fertilizer products (check %Fe and %S on fertilizer specifications).

Spring Preparation (March & April):

- Commence weekly verti-cutting in early March to remove thatch. **Roll after each verticut. Verti-cutting and rolling bent grass stimulates growth, not reduces it. Verti-cutting and rolling moss and Poa annua impedes their growth.**
- Weekly mowing at 5/16" (0.3125).
- Conduct a soil test in early March before fertilizer is applied (if that is the practice in the past – best to take core samples the same time each year).
- Early to mid-March, in dry weather, core aerate the greens with 1/4" to 3/8" hollow tines. Remove and dispose cores after partial drying. Top dress within 24 hours with premium, graded sand (0.6 mm minimum to 1.0 mm maximum), 3 to 5 tonnes per green, depending on core size and amount of levelling required.
- Check pH on a grid for each green and adjust with dolomite, to increase pH, or mineralized Sulphur to decrease pH (5% Sulphur content in fertilizer) to adjust pH to approximately 6.5 to 6.7 (6.2 to 6.8 range – ideal is 6.5 to 6.7) to promote nutrient uptake (mainly nitrogen) and microorganism activity.
- Apply starter fertilizer after coring and start wetting agent/surfactant treatments in mid-March, before deep-seeding. Repeat as required until October (**frequent applications of small doses of fertilizer is preferred, every 2 weeks, weather permitting**).
- Within 2 weeks of coring and fertilizer addition, dry weather permitting, deep-seed with creeping bent grass seed at a rate of approximately 0.8 pounds seed per 1,000 square feet, or approximately 10 to 12 lbs for each of our two greens at SPLBC. Use premium, graded sand for a bulking agent for any over-seeding applications. Apply into fresh

verticutter grooves (or deep-slit grooves) and roll the green after grilling the sand and seed in, then water thoroughly every day for a week to keep greens moist and promote seed germination.

- Twice weekly mowing should start April 1st. First two cuts at 1/4" (0.250), then at 7/32" (0.219) height for the start of bowling. Roll the green immediately after every cut in April and May (on alternating days if preferred).
- Mowing every second day should start by the last week of April, if grass growing weather has been cooperative (light and heat units). Roll the green after every cut.
- Infrequent and deep soak irrigation only as required between rain events to maintain soil moisture at approximately 5% to a depth of 4 to 6 cm after irrigation. **Irrigate at the onset of bent grass wilt.**

Spring Bowling (April to June):

- Continue mowing at 7/32" (0.219) every second day and roll on alternate days until the greens firm up (late May or early June).
- Conduct weekly (single direction) verti-cutting followed by rolling. Note: do not verti-cut the first 1-2 meters from the ditch starting in May (bowling season).
- If the greens are firm: spike the green in late June or early July, weather permitting (must be dry), with 3/16" or 1/4" solid tines on the aerator. Light top dress the green immediately afterwards with seeded sand and grill into the green, then roll, and watering immediately afterwards daily for a week to germinate the seed.
- **Give the greens 1 to 3 days rest after spiking and over-seeding.**
- To promote deep root growth, water infrequently when there is no rain, as determined by the onset of grass shoot wilting. Irrigate to saturation (visible pooling). Repeat as required, **except in exceptional heat** conditions and to wash in the surfactant and fertilizer (depends on green drainage efficiency and weather).

Summer Bowling (July to September):

- Once the greens have firmed up from drier weather in July and traffic on the greens, reduce the height of cut to 3/16" (0.1875") for the playing season.
- Continue mowing at 3/16" height every second day and rolling on alternate days until mid-July then reduce rolling to once per week, if required for greens speed, until September.
- Continue to fertilize at least once per month.
- Reduce the verti-cutting frequency to once every 2 to 3 weeks until August, every 3 to 4 weeks during August, or if daily temperature is over 28C and night lows are over 18C. Avoid verti-cutting in hot, dry weather.
- To promote deep root growth, water infrequently when there is no rain, as determined by the onset of grass shoot wilting. Irrigate to saturation (visible pooling). Repeat as required, **except in exceptional heat** conditions and to wash in the surfactant and fertilizer (depends on green drainage efficiency and weather).

Fall Bowling and Closure (September to December):

- Reduce mowing frequency to twice a week and increase height of cut to 7/32" (0.219) during active bowling in September.
- During the first 2 weeks of September, once bowling stops, core aerate the green with 3/8" or 1/2" hollow tines, depending on greens compaction (more compacted = larger hollow tine diameter). Top dress (premium, graded sand) within 24 hours, approximately 5 tonnes sand per green depending on core size and levelling required, and then deep-seed again, preferably in mid-September to allow sufficient warm weather (above 10C at night) for seed germination.
- Irrigate frequently for seed germination and growth, as required.
- After aeration and deep-seeding, increase height of cut to 1/4 " (0.25) in September and then to 5/16" to 3/8" (0.3125 to 0.3725) in October until frost stops the growth of the green. Horizontal cutting can be mixed with diagonal cutting at this point.
- Continue to roll the greens once a week to remove dew/moisture and restrain fungus and moss, as the weather allows.
- In late October or early November apply a fungicide to impede fungus growth.
- In late October, treat the green with 10 to 20 pounds of dolomitic lime per 1,000 square feet to increase pH to 7 to 7.5 to impede moss and algae growth.
- A light top sanding applied in November can assist with moss control.
- Avoid all activity on the greens during frost or snow.
- Have a nice Holiday Season!!

Special Events:

Tournaments hosted by the club

- Stop irrigation 3 to 5 days prior to the tournament.
- Reduce height of cut to 3/16" (0.1875") – cut twice in opposing diagonal directions after dew/moisture removal the morning of the tournament and roll immediately.
- Roll after mid-day break.
- Light irrigation in the evening and repeat cut/roll procedure the next day if it is a two-day event.

Corporate Events hosted by the club

- Use long mats on ALL greens being used, both ends of greens, regardless of weather. Place the mats at the Plinth boards to minimize greens wear from "standing around" on the perimeter of the greens.
- Strict instructions to guests about standing on the banks if not actively bowling on the mat.
- Restrict consumption of alcohol and cola drinks on the greens.

Summary Schedule:

A summary schedule of greens maintenance practice for 2020 is shown below:

TASK DESCRIPTION	March	April	May	June	July	Aug	Sept	Oct	Winter	
Paid Contractors:										
Greenskeeper:										
Grass cutting - variable **									√	
Grass cutting - frequent **	1/week	2/week	3/week	3/week	3/week	3/week	2/week	1/week	TBD	
Verticutting/thatch control **	once/week	once/week	once/week	every 2 weeks	every 3 weeks	TBD	TBD	TBD	TBD	
Greens rolling **	once/week	after cut	after cut	after cut	after cut	TBD	TBD	TBD	TBD	
Soil Testing	√									
Coring/sanding	√						√			
Deep-seeding	√						√			
Lime addition **								√	√	
Fertilizer **	√	√	√	√	√	√	√	√	√	
Herbicide, Fungicide, Pesticide **	√	√	√	√	√	√	√	√	TBD	
Automated watering		√	√	√	√	√	√			
Mechanical Contractor(s):										
Initial machine servicing/repairs	√	√							√	
Regular machine servicing/repairs		√	√	√	√	√	√	√		
Machine winterizing									√	
		NOTE **	<i>Estimates only; actual frequency determined by weather conditions and greens use</i>							

NOTE: the exact timing of routine greens care, maintenance and fertilizer/additive treatments can change based on a number of inter-dependent variables including weather, greens use, machine maintenance, and availability of contractors, supplies and financial resources, and might be modified from one year to the next by the Greenskeeper as conditions dictate.

1.4 Task Descriptions

Greenskeeper

The paid Greenskeeper at SPLBC is responsible for the following activities:

- Greens mowing and regular rolling
- Greens verti-cutting and rolling as required
- Greens aeration (coring and spiking)
- Irrigation management, with volunteers input as requested
- Edge maintenance at the Plinth interface
- Greens repairs and patching
- Weed control, herbicide and fungicide applications
- Nutrient and additive management, including March core samples and assays
- Basic preventative maintenance for greens machines: mowers, verti-cutter, edger, roller

Other Contractors

Occasionally we hire outside contractors for a variety of tasks around the greens, including:

- Specialty aeration and deep-seeding (if required)
- Top-dressing and chain dragging (if required)
- Turf patching (large areas)
- Major machine maintenance and break-down machine maintenance
- Plinth and backboard/bankboard replacement
- Irrigation system repairs and major plumbing repairs
- Major electrical repairs
- Greens lighting repairs and upgrades

Volunteers

Our Greens Team Volunteers, led by the Greens Team Leader, and the Greens Team Advisory Committee look after a number of regular greens care duties, including:

Greens Team Leader:										
Coordinate Greens Team Volunteer activities	√	√	√	√	√	√	√	√	√	√
Rink markers, lane selection/scheduling	√	√	√	√	√	√	√	√	√	√
Sprinkler system adjustment for greenskeeper		√	√	√	√	√	√	√		
Coordinating hand watering for Greenskeeper		√	√	√	√	√	√	√		
Communications with Greenskeeper	√	√	√	√	√	√	√	√	√	√
Communications for machine maintenance	√	√	√	√	√	√	√	√	√	√
Communications to SPLBC Executive	√	√	√	√	√	√	√	√	√	√
Prepare annual report and budget								√		
Greens Team Volunteers:										
Spring cleanup	√	√								
Ditch maintenance	√	√	√	√	√	√	√	√	√	√
Clubhouse gutter cleaning	√								√	
Coring reject collection/disposal	√							√		
Greens rolling ** - occasional	TBD									
Crow hole and divot fill	√	√	√	√	√	√	√	√	√	√
Debris cleanup	√	√	√	√	√	√	√	√	√	√
Sidewalk sweeping	√	√	√	√	√	√	√	√	√	√
Rink marker maintenance		√								
Verge grass maintenance	√	√	√	√	√	√	√	√	√	TBD
Pest control (ants, crows, geese, rodents)	√	√	√	√	√	√	√	√	√	√
Brush/drag greens for dew control		√	√	√	√	√	√	√	√	
Hand watering if requested		√	√	√	√	√	√	√		
Greens Advisory Committee:										
Review meeting/mentoring as required										
Greenskeeper contract - annual review									√	
Annual greens report and budget review								√		
Long term greens plan + greens capital plan										
Greens contractors management										
Maintenance contractors management										

Detailed task descriptions for the Greens Team Volunteers are posted in the clubhouse at the West door and are included here in **Appendix AA**. These tasks include: ditch maintenance, rink marker maintenance, crow hole repair, debris cleanup, verge grass maintenance, dew control and sidewalk cleaning. A detailed job Description for the Greens Team Leader is included in **Appendix BB**.

Succession Plan

It is important to develop a minimum 3-year succession plan for the following people, led by the Greens Advisory Committee:

- Greenskeeper
- Greens Team Leader
- Greens and Maintenance Contractors

2.0 SHOP & MAINTENANCE

2.1 Tools and Resources (2020)

There are considerable shop resources at SPLBC, including mechanical, electrical and carpentry tools, consumables and spare parts. Our 2020 inventory can be summarised:

Equipment Description		Serial #	\$ Replacement
Machinery:			
Toro Greensmaster 1000	#7	Model 04052 SN-210002690	7,500
(11 blade mower reel)	#10	Model 04052 SN-230000683	7,500
	#15	Model 04052 SN-52270	7,500
Eco250 Top Dresser		1624	7,300
Toro Greens Aerator (3/4" round mount tines)		Model 09120 SN-70152	9,500
Craftsman YT3000 Tractor		061505B-005087	800
Ryan Power Rake - Reno-Thin IU 24 blade 1/16"		Model 544865 SN94506408	2,350
Honda CX120 Edge Cutter		-	700
Honda GC160 Power Washer		BEEX-2705HWCOMX	900
Andersons Seeder		-	100
Fertilizer/Seed Spreader		-	100
Wood Bay Greens Iron 6200		2724547	11,950
Husqvarna GCV160 Lawn Mower		838NH1	600
CH Air Compressor		L081794-00294	250
Stihl BR450 Leaf Blower		515319147	400
Stihl BG50 Leaf Blower		506 422 988	100
B&D Blower/Vacuum BV1500 (electric)		-	50
Homelite String Trimmer - 26CS (gas)		EU13053	150
Homelite Extension branch saw		-	300
Ryobi Weed Trimmer		-	150
B&D TR165 Hedge Trimmer		-	150
Sprinkler System:			
	Rainbird controller ESP-TM2	-	250
	(6) Toro Heads c/w solenoid	-	600
	(2) Manual heads	-	100
Shop-Vac 6.5HP			250
SPARE PARTS		-	500
CONSUMABLES		-	250
Subtotal Machinery			60,300

Equipment Description	Serial #	\$ Replacement
Power Tools:		
Hitachi C10FR Table Saw	380050	500
Jobmate Drill Press		250
Bench Grinder		150
Ryobi Chop Saw		250
Subtotal Power Tools		1,150
Tool Box:		
Hand tools - variety		250
Subtotal Tool Box		250
In Locked Cabinet - Hand Tools:		
Mastercraft Jigsaw		120
Dewalt Circular Saw		150
Dewalt 3/8" Electric Drill		100
B&D Belt Sander		100
Mastercraft Sheet Sander		75
Hand solder gun		30
Mastercraft Cordless Screwdriver		60
Skil Cordless Screwdriver		60
Arrow Staple Gun		35
Mastercraft Tape Measure (30m)		50
Snap Lin Tool & Chalk		50
1/2" Dewalt Drill - battery power		125
Mastercraft Eliminator battery charger		100
Multimeter		100
Dewalt 3/8" Impact wrench DCF883	781590	200
Accu-Gage mower calibration caliper		350
Subtotal Locked Cabinet - Hand Tools		1,705
Equipment Description	Serial #	\$ Replacement
Garden Tools & Carts:		
Wheelbarrow - 4 wheel		200
Wheelbarrow - standard (2)		200
Hosemobile 2000 (2)		200
BBQ Napoleon - Natural Gas	x 2	2,200
Roller Dolly (orange)		100
Subtotal Garden Tools & Carts		2,900
(8) Lights Standards and lights		100,000

Important Spares Inventory, Greens Maintenance Machinery:

As of September, 2020:

- Toro mower blade reel: zero
- Toro Knife Blades: zero
- Aerator Tines: 16 x 3/8" hollow (new); 15 x 1/2" hollow; 12 x 1/4" solid (new); 7 x 3/16" solid
- Power rake blades: zero
- Engine wear parts (plugs, belts, filters): miscellaneous
- Rainbird/Toro irrigation system parts: miscellaneous

2.2 Shop Duties and Scope

Under the direction of the Greens Team Leader, and in cooperation with the Greens Advisory Committee, in 2020 the shop duties and scope of services provided by volunteers and contractors can be summarised as follows:

Greens Team Volunteers

- Maintenance planning and maintenance log
- Contractor liaison and supervision
- Day-to-day shop organization
- Small engine preventative maintenance and minor repairs
- Tool repairs and maintenance, including gardens and BBQ equipment
- Toro mowers – preventative maintenance including lubrication, bed knife back-lapping, bed knife replacement
- Aerator preparation and cleanup
- Power rake preventative maintenance and cleanup
- Top dresser preparation and cleanup, belt alignment
- Battery charging – Craftsman tractor and Toro Aerator
- Wear part procurement and replacement
- Day-to-day shop consumables and spare parts – procurement
- Fuel mixing (50:1 two-stroke engine mix)
- Miscellaneous mechanical, electrical (non-code) and carpentry projects
- Gardens and surrounds care and maintenance
- Clubhouse outdoor care and preventative maintenance (gutter, roof, water systems)
- Equipment safety and operations training
- Assist the Greenskeeper with equipment as directed by the Greens Team Leader
- Irrigation system adjustments if requested by the Greenskeeper to the Greens Team Leader
- Bowling rakes and ancillaries

Contractors

- Major mechanical and electrical equipment service and repairs, including break-down repairs
- Sprinkler system repairs and calibration
- Large area sod patches
- Deep-seed treatment with Maredo deep slit tine machine
- Backboard and plinth replacement
- Specialty projects and machining services

Greenskeeper

- Greens care and maintenance equipment operation (mower, verticutter, edger, aerator, greens iron, top-dresser)
- Nutrient, chemicals and additive planning and supply (expensed)
- Fuel supply (expensed)
- Spring core samples and assays
- Irrigation system operation and liaison with Greens Team Leader
- Regular communications with the Greens Team Leader and Shop Volunteers

Preventative Maintenance Schedule

A summary of preventative maintenance and servicing needs for the major equipment used in Greens Care & Maintenance is shown below, with Weekly and Monthly maintenance work completed by shop volunteers and Annual major service and repairs completed by a mechanical contractor:

SPLBC PREVENTATIVE MAINTENANCE SCHEDULE - SHOP VOLUNTEERS, SMALL ENGINES

Updated 15-Jul-20

Shop Volunteers
Contractors

Equipment Description	Oil	Weekly	Monthly	Annual	Comments	Cost
Toro Greensmaster 1000 #7	10W30	Clean air pre-filter Check oil	Clean air filter Check grease (9) Back-lapping bed knife Check tire pressure	Major service - Jan or Feb (belts, cables, carburetor, plug, filters, oil change)		250
				Replace blade reel - 2020		475
				Blade sharpening - semi annual Replace bed knife - May 2020		75
Toro Greensmaster 1000 #10	10W30	Clean air pre-filter Check oil	Clean air filter Check grease (9) Back-lapping bed knife Check tire pressure	Major service - Jan or Feb (belts, cables, carburetor, plug, filters, oil change)		250
				Replace blade reel - 2021		475
				Blade sharpening - semi annual Replace bed knife - Sept 2020		75
Toro Greensmaster 1000 #15	10W30	Clean air pre-filter Check oil	Clean air filter Check grease (9) Back-lapping bed knife Check tire pressure	Major service - Jan or Feb (belts, cables, carburetor, plug, filters, oil change)		250
				Replace blade reel - 2022		475
				Blade sharpening - semi annual Replace bed knife - July 2020		75
Eco250 Top Dresser	10W30	None	None	Service check - carburetor, fuel, plug, filters Prep for sanding - March, Sept Cleaning after sanding - March, Sept		250
Toro Green Aerator	10W30	None	None	Service check - carburetor, fuel, plug, filters Replace hollow tines	Charge starter battery when not in use	250
				Prep for aeration - March, June, Sept		300
				Cleaning after aeration - March, June, Sept		
Craftsman YT3000 Tractor	10W30	None	None	Service check - carburetor, fuel, plug, filters	Charge starter battery when not in use	
Ryan Power Rake - Verticutter (7 hp)	SAE 30	Clean air pre-filter Check oil	Clean air filter Check grease/lubricate Check blades for damage	Major service - Jan or Feb (belts, cables, carburetor, plug, filters, oil change)		200
				Replace blades - 2020		300
Honda CX120 Edge Cutter	10W30	None	Check oil Check grease/lubricate Check filters	Major service - Nov to Feb (belts, cables, carburetor, plug, filters, oil change) replace blade		100
				50		
Honda Power Washer	10W30 Pump Oil	None	Check oil, filters, leaks	Major service - Nov to Feb (check pump, carburetor, plug, filters, oil change) Repair leaks		100
Wood Bay Greens Roller Iron 6200	10W30 Pump Oil	None	Check oil Check grease/lubricate Check filters	Major service - Nov to Feb (drive, cables, carburetor, plug, filters, oil change)		150
Honda GCV160 Lawn Mower	4-stroke	Check oil	Clean air filter Check grease/lubricate Check blade for damage	Major service - carburetor, plug, filters Sharpen blade		125
				25		
CH Air Compressor	-	None	Drain condensate	Check for leaks/pressure fittings		25
Stihl BR450 Leaf Blower	Stihl	Check fuel mix	Repair as needed	Service check - carburetor, fuel, plug, filters		100
Stihl BG50 Leaf Blower	Stihl	Check fuel mix	Repair as needed	Service check - carburetor, fuel, plug, filters		100
Homelite Weed Trimmer (gas)	Stihl	Check fuel mix Check string supply	Repair as needed	Service check - carburetor, fuel, plug, filters		100
				50		
Ryobi Weed Trimmer	-	Check string supply	Repair as needed			25
Sprinkler System:						
Rainbird controller		None	None	Review programming	Repair as needed	400
(6) Toro Heads c/w solenoid		None	None	Review operation, calibration	Repair as needed	
(2) Manual heads		None	None	Review operation, calibration	Repair as needed	
Subtotal Shop - Preventative Maintenance						5125
Shop - Spare Parts & Consumables:						
Gasoline - note Chevron 94 octane ONLY !!			Greenskeeper		Chevron Gas station	300
Mixed gas 50:1 Shop Volunteer Only		Shop Volunteer			Stihl 2-stroke oil fuel mix - online order	20
Shop supplies:						
Oil (10W30, SAE 30, Pump Oil, 4 stroke lawn mower)				Shop Volunteer	Canadian Tire - 1 litre per year for each type	30
STP Fuel additive				Shop Volunteer	Canadian Tire - 1 litre per year	10
Filters (air and fuel)				Contractor		
Plugs				Shop Volunteer	Canadian Tire as required	20
Grease				Shop Volunteer	Canadian Tire, bearing/machine lube - 1 lb	10
Shop Towels				Shop Volunteer	Variou - 12 rolls/year	50
Subtotal Shop - Consumables						440
Shop - Critical Spares Purchases:						
Allotment						250
Subtotal Shop - Critical Spares Purchases						250

2.3 Equipment Safety, Training and Operation

We have initiated an equipment safety and operation training program for the equipment used by our Greens Team Volunteers on a regular basis. The objective is to provide guidelines for volunteers in the safe operation of motorized equipment as well as provide basic instructions in the proper use and care of our machines to reduce maintenance and machine replacement costs in the future. The first instructions completed in 2020 are included here in **Appendix CC**

Succession Plan

It is important to develop a 3-year succession plan for the shop, for the following people, led by the Greens Team Leader:

- Shop Team Leader
- Shop Volunteers

2.4 Shop Maintenance Plan & Budget

Annual Plan and Budgeting

Greens Care and Maintenance Machines

Recommended annual maintenance and monthly preventative maintenance for machines used by the Greenskeeper and volunteers in the care and maintenance of the greens includes:

Toro Mowers

- In January/February engine and wear part major service by an outside mechanical contractor - \$250 for each machine (includes engine wear parts).
- Replace the bed-knife approximately 1 month after the Spring top-dressing and over-seeding (or deep-seeding) - \$75 for each knife and screws.
- Semi-annual blade reel grinding: inspect reels for pits, damage and bevel wear - \$75 to \$100 for each blade reel. Annual replacement of the blade reel on at least one Toro mower - \$475 plus labour.
- Monthly: preventative maintenance/lubrication, back-lapping of bed knives – by SPLBC volunteers.

Greens Iron

- Between November to February engine and wear part major service and roller bearing inspection by an outside mechanical contractor - \$250 (includes engine wear parts).
- Monthly: preventative maintenance/lubrication – by SPLBC volunteers.

Power Rake (verti-cutter)

- In January/February engine and wear part major service and blade sharpening by an outside mechanical contractor - \$200 (includes engine wear parts and blade sharpening). If blade replacement is required - \$300 for set of 1/32” blades.
- Monthly: preventative maintenance/lubrication, check blade wear/mounting – by SPLBC volunteers.

Edge Cutter

- Between November and February engine and wear part major service and blade replacement by an outside mechanical contractor - \$150 (includes engine wear parts and new blade).
- Monthly: preventative maintenance/lubrication, check blade wear/mounting – by SPLBC volunteers.

Aerator

- In January/February engine and wear part service check and bearing inspection by an outside mechanical contractor - \$250 (includes engine wear parts).
- Replacement tines, set of hollow tines (3/16” to 5/16”) every two years: \$200

- Tine inventory inspection and machine preparation – Greenskeeper and SPLBC volunteers

Top Dresser

- In January/February engine and wear part service check and belt alignment/bearing inspection by an outside mechanical contractor - \$250 (includes engine wear parts).
- Machine preparation, preventative maintenance and occasional belt alignment – by SPLBC volunteers

Leaf Blowers

- Between November and February engine and wear part service check by an outside mechanical contractor - \$100 for each machine (includes engine wear parts).
- Preventative maintenance and minor repairs – by SPLBC volunteers

Lawn Mower

- Between November and February engine and wear part major service and blade sharpening by an outside mechanical contractor - \$150 (includes engine wear parts and blade sharpening).
- Preventative maintenance and minor repairs – by SPLBC volunteers

Power Washer

- Between November and February engine and wear part service check by an outside mechanical contractor - \$200 (includes engine wear parts).
- Preventative maintenance and minor repairs – by SPLBC volunteers

3.0 LONG TERM PLANNING

3.1 Current Greens Conditions 2020

A summary of the greens conditions as at January 2019 is included in “Greens Briefing Notes”, reference 6 in Section 4.0. An update to those briefing notes is as follows:

Greens

East Green

The East Green showed major damage in two areas: along the west perimeter, under the shade caused by the median trees, as well as the NE corner, also under considerable shade. In addition, the south perimeter shows chronic poor grass quality and a number of bare patches.

The green is a mix of creeping bent grass and *cotula dioica*, with some patches of *Poa annua* and rye grass. There is some thatch present but not overwhelming.

West Green

The West Green is similar in grass plant makeup to the East Green, but with additional areas of damage caused by previous moss and/or algae growth. The south perimeter shows some bare spots like the East Green. There is also an area in the NW corner of this green that appears to be chronically dry, or has different soil/sand chemistry resulting in poor grass health.

The patch installed along the east perimeter of the West Green last year shows good grass plant health, however, the grass cover is sparse with shallow roots and little or no *cotula* or thatch present to provide a dense cover. This area will continue to be weak under wet conditions until the turf matures more.

The greens will continue to contain a mixed population of grass species, and resultant inconsistent playing surface, unless the greens are replaced entirely – either with new bent grass sod and/or artificial turf. It is important to note: if a green is replaced with new sod, realistically it will take 1 year to allow root maturity for active bowling on that green.

Irrigation

West Coast Irrigation was hired in 2020 to make repairs to the existing automated irrigation system: replacement of the valve at Zone 5 and repairs to the valve on Zone 6. All other zones were tested and calibrated. SPLBC volunteers raised the level of Zone 4 sprinkler head to bring it up to the plinth level, along with minor turf patching around the sprinkler head.

West Coast Irrigation reported that the line pressure from the City source for irrigation water is at 130 psig. The sprinkler heads are rated for maximum 150 psig. Investigations were initiated

in 2020 to define alternatives for sprinkler heads: to provide a finer spray and more consistent irrigation coverage, which should improve greens quality. In addition, the automated irrigation protocol in 2020 for the East Green has been frequent and limited quantity of water (daily in the evening for approximately 3 minutes, unless there is rain), while the protocol for the West Green has been changed to infrequent and deep watering to saturation (wait for the grass to wilt before watering). During hot, dry weather the irrigation protocol was modified to increase frequency on both greens to manage moisture content of the root zone, including hand-watering as required.

Hand watering is requested on occasion by the Greenskeeper for selected areas, and carried out by qualified SPLBC volunteers.

The pH of the City water is 7.5 to 7.7 at source, buffered with sodium carbonate, which is not ideal for bent grass growth. Using less City irrigation water, if possible, is preferred.

Drainage

The Greenskeeper and SPLBC volunteers have initiated testing for moisture content in the root zone (4 to 6 cm into the turf) on a constant grid in 2020 using a hand-held moisture meter, to compare irrigation practices (noted above under "Irrigation") and greens drainage.

Todate, based on root zone moisture content, there are no indications of significantly different drainage patterns between the two greens. In general the greens drain from the high point (NE corner of the East Green and NW corner of the West Green) to the drainage outflow point at the south end near the south gate for both greens. That is, the greens tend to be drier at the high point of the drainage trend. Poor drainage can also be caused by high thatch content in the greens, which has been addressed in 2020 by frequent verti-cutting the greens. Additional testing and observation is required under a variety of moisture conditions to reach any definitive conclusions about comparative greens drainage.

In 2020 we will make a request to the Park Board (City) to clean the drainage outflows to ensure there are no blockages at the outflow points.

Patches

The bare patches at chronically wet areas, under the central median tree shade and in the NE corner of the East green, have been replaced using bent grass turf patches which were installed by English Lawns, 2019 and 2020. Todate the patches have established good bent grass bowling greens in those locations. After approximately 3 months during the growing season the patches can be used for bowling play, with extra care for greens protection by frequent rink rotation, use of long mats and avoid play during and following rain. NOTE: the Greenskeeper mows the patches with HOC set at approximately 1/16" to 3/32" higher than the other playing surface, until the patches are fully established.

Long term mitigation by trimming/pruning the over-hanging trees might not be possible due to resistance by the Park Board to trim healthy trees and therefore continued patching might be necessary in certain problem areas impacted by trees.

Following plinth replacement on the West Green in 2020, SPLBC volunteers used pieces of the turf that were removed for plinth repair purposes to patch the plinth perimeter (approximately 8 inches wide from plinth), with adequate success and grass coverage. **NOTE:** in future, turf pieces should be re-used within 3 days of removal for best results.

In June 2020, the Greenskeeper completed small area patches, less than 3 sq ft each, on the southern perimeter of the East Green and the NW corner of the West Green.

Additional patching might be required in future on the southern perimeters of both greens, from the plinths to approximately 2 to 3 meters into each green – for further evaluation by September 2020.

Ditches, Plinths, Backboards & Surrounds

The backboards were re-faced with treated lumber in 2013 and asphalt surrounds added on the north perimeter and central median the same year. In 2016 Velcro strips were added to the backboards for lane markers, eliminating the potential hazards from protruding screws previously used to secure lane markers. The plinths on the West green were replaced in early 2020 due to wood rot, which included digging the ditches to 2 foot depth and removing tree roots. The ditches on both greens were refilled with new sand in April 2020.

Painting of the bank boards, at the pavement/grass verge interface, on both greens was completed in July 2020. Some minor repairs to the new plinths were required on the south side of the West Green due to board warping. **The plinths on the East green will require replacement as soon as funds are available.**

Lighting

The greens lighting for evening play is aging and consideration of upgrading and/or replacement is in progress in 2020. Options for evaluation include:

- Upgrading the existing lights with LED bulbs; to reduce power consumption and increase light quality/intensity.
- Replace the existing light standards with new lighting poles and LED bulbs; to reduce power consumption, increase light intensity and improve lighting coverage around the trees on the median between the greens. This option will require Park Board approvals and possibly financial/materials/labour contribution from the City.

Updated quotations for both alternatives are required for consideration in the long-term club financial plan.

3.2 Best Practices – SPLBC

Greens Care & Maintenance

As outlined in sections 1.2 and 1.3.

Rink Management

As outlined in section 1.2

Equipment Maintenance

As outlined in section 2.2, 2.3 and 2.4

Special Events

As outlined in section 1.2 “Special Events”

4.0 REFERENCES & RESOURCES

1. *"A Definitive Guide to Maintaining a Bowling Green"* – posted by Duncan Gray, March 8, 2019 (UK)
2. *"Best Management Practices for Irrigating Turf"* - Rutgers Cooperative Extension, 750-0205, 2002 (US)
3. *"Bowling Green Maintenance & Management"* by Lloyd Woods, April 1994 (Victoria BC)
4. *"Bowling Green Maintenance Practices"* by Stephen Forrest, STROBE Turf Management, May 2016 Update (Can)
5. *"Creeping Bentgrass Management"* by Peter Dernoeden, 2nd Edition 2013 ISBN 978-1-4665-0992-4, online excerpts (US)
6. *"Greens Briefing Notes"* – posted by Keith Warriner, January 2019 (SPLBC)
7. *"Principles of Turfgrass Irrigation"* – posted by John C Harper, PennState Extension, Nov 10 2016 (US)
8. *"Turfgrass and Environmental Research Online"* – USGA, Vol 8, No. 14, July 2009 (US)

- ❖ Anderson, Scott – SPLBC Greenskeeper 2020
- ❖ Arnott, David – Granville LBC, Kerrisdale LBC - personal communication March, April, June 2020
- ❖ Bos, Bert – Bos Sod – personal communication March, April 2020
- ❖ Broad, Nick – English Lawns – personal communication March, April, May 2020
- ❖ Chapman, Howard – West Vancouver LBC, personal communication June, 2020
- ❖ Differ, Pat – JCL Ag Services – personal communication February, March, April 2020
- ❖ Forrest, Stephen – Port Alberni LBC – personal communication June 2020
- ❖ Huxley, Philip - West Coast Sprinklers – personal communication April, May 2020
- ❖ Oak Creek Golf & Turf – personal communication April, May 2020
- ❖ Speranza, Doug – Extreme Turf (GPLBC, PGLBC, WVLBC) – personal communication March, April, May 2020
- ❖ Sykes, John – BC InstantLawn – personal communication March, April 2020
- ❖ Warriner, Keith – personal communication January – June 2020
- ❖ Young, Glen – personal communication January – June 2020

5.0 APPENDICES

Appendix AA Volunteer Task Descriptions

TASK	COMPONENTS	WHEN	TOOLS USED	PHYSICAL DEMANDS
DITCH MAINTENANCE	REMOVING GRASS/WEEDS	SPRING/SUMMER /FALL	HOE/TROWEL	WORK ON KNEES
	REMOVE LEAVES/ DEBRIS	YEAR ROUND	DITCH RAKES WHEELBARROW	STOOP AND LIFT LIGHT LOADS
	LEVEL SAND TO 2" BELOW PLINTH	SPRING	WHEELBARROW, SHOVEL, RAKE	SHOVEL SAND AND LIFT BARROW

Notes:

Leaf removal is important to prevent mould and need is heavy after bowling season

All organic material to be deposited in bin shared with Stanley Park gardeners.

Sand found in bin at south east corner of east green

TASK	COMPONENTS	WHEN	TOOLS USED	PHYSICAL DEMANDS
RINK MARKER MAINTENANCE	REPAIR VELCRO RINK MARKER STRIPS	SPRING AND SUMMER AS NEEDED	VELCRO STRIPS, SCISSORS	KNEELING
	CLEAN BACKBOARDS	SPRING CLEAN-UP	STEEL BRUSH	BENDING
	PAINT RINK MARKER DOTS ON BACKBOARDS	LATE SPRING AS NEEDED	PAINT, BRUSH, SPRAY CAN	BENDING
	MOVE RINK MARKERS FOR RINK DESIGNATIONS	WEEKLY DURING BOWLING SEASON		BENDING

Notes:

Planning committee should review use of coloured dots on face of backboard

Greens Team Leader responsible for assigning rinks for play and change daily or weekly as required to maintain greens health

TASK	COMPONENTS	WHEN	TOOLS USED	PHYSICAL DEMANDS
"CROW HOLE" FILLING	REMOVE DEAD GRASS	SPRING/SUMMER AS NEEDED	SAND BUCKET	BENDING
	FILL HOLE WITH SAND/SEED/FERT MIXTURE, STOMP AND LEVEL		TROWEL	SOME WORK ON KNEES

Notes:

Use "concoction" prepared by Greenskeeper (sand, seed and fertilizer mix), surrounding grass will fill in

"Crow holes" include any holes or gaps in the greens grass between ¼ and 3 inches diameter

TASK	COMPONENTS	WHEN	TOOLS USED	PHYSICAL DEMANDS
CLEARING GREENS OF DEBRIS	BLOWING LEAVES, PINE-CONES AND NEEDLES, SEEDS, ANIMAL POOP, ETC. FROM GREENS	YEAR ROUND	GAS POWERED, LARGE LEAF BLOWER EAR PROTECTION	ABILITY TO CARRY 30 LB BLOWER ON BACK HARNESS
			OIL/GASOLINE MIXED FUEL	TOPPING UP AND STARTING BLOWER
	*REMOVAL OF DEBRIS FROM DITCHES			

Notes:

Any debris on greens needs to be removed asap as harder objects will nick blades of green mowers and organic debris will encourage growth of mould and disease and/or change the pH of the greens soil, challenging the preferred bent grass to grow.

*Debris blown into ditches should be removed in cooperation with volunteers responsible for ditch cleaning

TASK	COMPONENTS	WHEN	TOOLS USED	PHYSICAL DEMANDS
MAINTAINING VERGE GRASS	CUTTING ALL GRASS ON PROPERTY NOT ON GREENS	SPRING, SUMMER, FALL AS NEEDED	GASOLINE POWERED SELF-PROPELLED MOWER HEARING PROTECTION PERSONAL WORK BOOTS	ABLE TO CONTROL MOWER
	CLEARING GRASS OF MOVABLE IMPEDIMENTS	BEFORE MOWING		SOME LIFTING
	TOPPING UP MOWER WITH GASOLINE AND OIL	BEFORE MOWING	REGULAR GASOLINE AND MOTOR OIL	
	CLEANING UNDERSIDE OF MOWER	AFTER MOWING	GARDEN HOSE	
	VERGE MOSS CONTROL	SPRING AND SUMMER	"MOSS-B-GONE" SPRAY AND GARDEN HOSE	ATTACHING 3 LENGTHS OF GARDEN HOSE

Notes:

Important to check grass for raccoon and goose waste prior to mowing

Operator safety means using personal work boots and club supplied hearing protectors

Verge moss is a huge problem especially under the South hedge and needs to be controlled or it will transfer to the greens. Two applications may be needed.

Do NOT use "Moss-B-Gone" on greens

TASK	COMPONENTS	WHEN	TOOLS USED	PHYSICAL DEMANDS
MORNING DEW CONTROL	BRUSHING GREENS TO BREAK UP DEW	BEFORE PLAYING ON A GREEN WITH DEW ON IT	LARGE PULL BRUSH	WALKING WHILE PULLING BRUSH

Notes:

A duty for all morning players.

Green damage will result if frosted or dew-covered greens are walked on.

TASK	COMPONENTS	WHEN	TOOLS USED	PHYSICAL DEMANDS
SIDEWALK CLEANING	BLOWING DEBRIS	YEAR ROUND, AT LEAST 1 X WEEK	LIGHTER LEAF BLOWER	ABILITY TO HOLD AND CONTROL 10 LB LEAF BLOWER
	TOPPING BLOWER UP WITH GASOLINE	BEFORE EACH USE	OIL/GASOLINE MIXED FUEL	
	DEEP CLEAN ASPHALT WHERE NEEDED	SPRING	PRESSURE WASHER	ABILITY TO MANAGE HIGH PRESSURE WASHER

Notes:

Cleaning the sidewalks reduces dirt transferred onto the greens and into the clubhouse as well as contributing to the neat appearance of the grounds.

Sidewalk debris can be blown onto verge or out the front gate.

TASK	COMPONENTS	WHEN	TOOLS USED	PHYSICAL DEMANDS
HAND WATERING	WATERING DANGEROUSLY DRY SPOTS ON GREEN	AS NEEDED, USUALLY IN HEAT OF SUMMER	GARDEN HOSE, NOZZLE/ SPRINKLER	
	WATERING TRANSPLANTED SOD OR NEW SEED	AS NEEDED	GARDEN HOSE, NOZZLE/ SPRINKLER	

Notes:

Some spots on green are chronically dry and, in a drought, may need daily watering over and above regular irrigation

Should be done only on direction of Greenskeeper or Greens Team Leader

TASK	COMPONENTS	WHEN	TOOLS USED	PHYSICAL DEMANDS
GREEN "IRONING" OR "ROLLING"	ROLLING GREENS WITH LIGHT WEIGHT ROLLER	INFREQUENTLY BY VOLUNTEERS	CLUB OWNED GREEN IRON RAMPS	HEAVY PULLING AND SHOVING TO MOVE IRON ONTO GREENS

Notes:

Normally done by the Greenskeeper. This is a high-skill task for a trained operator under the supervision of the Greenskeeper or Greens Team Leader.

A crew of at least 2 is required to safely move the iron onto the greens.

The purpose of rolling is to temporarily eliminate small bumps and increase the speed of greens. **Greens rolling is done after each cut by the Greenskeeper,** usually the day after the cut, during the early season until the greens firm up. Rolling is also done after verti-cutting, as required. Rolling is useful for moss and Poa annua control as well as discouraging mole infestations.

TASK	COMPONENTS	WHEN	TOOLS USED	PHYSICAL DEMANDS
CORING & SANDING	REMOVING CORES FROM GREENS	USUALLY ONE DAY IN MARCH, ONE DAY IN SEPTEMBER	SNOW SHOVELS, WHEELBARROWS, RAMPS	MODERATE LIFTING
	DISPOSING OF CORES		GARDEN RAKES	LIGHT LIFTING
	*LOADING SAND INTO TOP DRESSER		SHOVELS	MODERATE TO HEAVY LIFTING
	*SPREADING SAND ON GREENS		HAND PULLED SAND SPREADER	MODERATE LIFTING
	*DRAGGING CHAIN MAT TO SPREAD SAND		TRACTOR, CHAIN MAT, RAMPS	MODERATE TO HEAVY LIFTING

Notes:

Typically, small, lighter cores are punched in the Spring, larger, heavier cores in the Fall.

*Depending on the level of service offered by the outside contractor hired to lead the coring sanding process, volunteers may be asked to perform a wider range of tasks.

With the permission of and under the direction of the Park Board gardeners, cores may be spread on low-lying spots on park grounds.

TASK	COMPONENTS	WHEN	TOOLS USED	PHYSICAL DEMANDS
CLUBHOUSE EXTERIOR MAINTENANCE	CLUBHOUSE RAIN GUTTER CLEANING	SPRING AND FALL	HIGH LADDER, TROWEL, WHEELBARROW, GARDEN HOSE	SAFE CLIMBING ON LADDER
	CLEANING OF ROOF EVES	SPRING	HIGH LADDER, BROOM, GARDEN HOSE	SAFE CLIMBING ON ROOF OF CLUBHOUSE

Notes:

This twice a year task should be a 2-person task for safety.

Work on the roof should only be done when roof is dry.

Removal of overhanging limbs greatly reduces need to clear gutters (Park Board job).

Leaf and litter debris can be disposed in the shared bin on west side of property.

Appendix BB

Job Description, Greens Team Leader

Communications:

Reporting to the Greens Advisory Committee (GAC) with periodic updates by meeting or email. Director-at-Large on GAC reports to the SPLBC Executive Committee as needed.

The Greens Team Leader coordinates the activities of the Greens Team Volunteers and the paid Greenskeeper with the objective of maintaining:

- two healthy, playable bowling greens,
- related bowls equipment, and
- grounds surrounding the greens including flower and planting areas.

The Greens Team Leader also provides timely liaison with the GAC on matters involving:

- a. Equipment maintenance – external contractors and club volunteers in the shop area.
- b. Speciality Contractors for greens maintenance as required.
- c. Park Board representatives as required.

Key Responsibilities and Duties

- Convene a team to prepare a maintenance plan for the greens and a long-term plan for updating the greens and capital equipment purchases.
- Liaise with Club Director-at-Large (Outside) to maintain communication with club Executive.
- Manage the Greens Team Volunteers for daily and weekly regular operations.
- Monitor and evaluate greens health and operations on an ongoing basis.
- Work with the GAC and Treasurer to prepare and monitor a yearly budget by September of each year and approve budgeted expenditures related to Greens activities.
- Monitor activities of the GAC with respect to: negotiation, enforcement and evaluation of any agreements with outside contractors assisting with greens maintenance; monitor and approve expenditures by such outside contractors.
- In cooperation with the GAC – monitor, and participate, if desired, in any major construction projects related to the greens or grounds.
- Ensure that the greens are suitable for club and tournament play.
- Prepare, for the President, an annual report to the Park Board on the condition of the greens and grounds.
- Consult professional greens forums, consultants and publications for assistance with greens maintenance practice, activities, projects and challenges.
- Liaise with the Games team for any special preparation necessary for special tournaments.
- Develop a succession plan for the position of Greens Team Leader.

Checklist for Greens Health:

(in cooperation with the Greens Team Volunteers, the GAC and Greenskeeper)

- ❖ Monitor the greens for problem areas and discuss mitigation measured with the GAC and Greenskeeper
- ❖ Direct the automatic sprinkler system schedule
- ❖ Direct hand-watering schedule and location with the Greens Team Volunteers
- ❖ Clean and groom the greens and the ditches as needed
- ❖ Recruit and direct volunteers to assist with greens maintenance tasks (e.g. ditches, crow holes, verge cutting).
- ❖ On a weekly basis assign and post a list of rinks for use by varying groups (daily draws, house leagues, corporate events, tournaments), ensuring a rotation to even the wear.
- ❖ In cooperation with the Shop volunteers, review the drainage and irrigation systems, and ensure winterization takes place at the end of the season and reestablishment takes place in the spring.
- ❖ Organize or delegate organization of volunteer work crews for routine and semi-annual maintenance of the greens and grounds.
- ❖ Direct volunteers to maintain the storage sheds in an orderly and safe condition.

Equipment Maintenance Checklist:

(responsibility of the GAC)

Monitor and cooperate with the GAC members responsible for equipment maintenance, club volunteer training and safe equipment operation.

- Monitor function of the machines used for greens and grounds maintenance and ensure that they are in good working order.
- Arrange for the service of club machines as needed and maintain records of such service.
- Review and update machine operating manuals.
- Recommend the replacement of non-functioning machines or the purchase of new machines.
- Arrange for the purchase, delivery and storage of gasoline and lubricants.

Gardens Checklist:

(responsibility of the Gardens Committee Leader)

Monitor and cooperate with the Gardens Committee Leader, Greens Team Volunteers and GAC members as required to:

- Attend a meeting of all club members involved in gardening and flower growing and display to plan for season and allocate “plots”.
- Maintain the gardeners’ shed in a safe and orderly condition.

- Provide resources from the Greens Team if possible to support garden activities.
- Maintain the gardens, including plantings and weeding.

Appendix CC Equipment Operating Instructions

SPLBC EQUIPMENT OPERATING INSTRUCTIONS							
Description:	Honda Pressure Washer TRAINING REQUIRED						
Fuel Type:	Chevron 94 gasoline ONLY						
Oil Type:	4-cycle Lawn Mower Oil - SAE 30						
Starting Procedure:	<p>Clean area around fuel filler cap</p> <p>Check fuel level - fill to below the fuel spout level DO NOT over-fill !! DO NOT add fuel when the engine is hot !!</p> <p>Check engine oil level - be sure to clean around the oil fill cap before removing the cap Add small amount of 4-cycle Lawn Mower Oil SAE 30, <u>if dip stick shows no oil</u> Oil level should be between the hatch marks on the dip stick</p> <p>Check pump oil level - oil level should not be below half or slightly less on sight glass Add 30W non-detergent <u>pump oil</u> as required DO NOT overfill !!</p> <p>Attach high pressure hose to quick-connect on end of spray gun Attach high pressure hose to quick-connect on pump Attach garden hose to garden hose connector on pump - turn on garden hose Attach preferred nozzle to tip of lance Pull trigger on spray gun to purge system of air</p> <p>If engine is cold: Slide choke lever to "<u>closed</u>" position by pulling OUT Slide throttle control "up" to fast position (rabbit) On a clean, level surface and firm footing - Pull the start cord slowly until it engages Pull with a short brisk, strong motion, 4 to (max) 5 pulls After a few seconds of engine running: slide choke lever IN slowly to "<u>open</u>" position If engine stops - try re-starting with half choke If engine does not start - slide choke lever to "open" position IN - try starting again</p> <p>If more than 5 pulls are required - contact a Shop Volunteer (see list below)</p>						
Cleanup Procedure:	<p>Slide throttle control "down" to OFF position</p> <p>Disconnect all hose connections and store high-pressure hose</p> <p>Brush debris from the machine</p>						
Shop Volunteers:	<table border="0"> <tr> <td>Glen Young</td> <td>604 562 7492</td> </tr> <tr> <td>Brad Marchant</td> <td>604 889 0119</td> </tr> <tr> <td>Larry Crebo</td> <td>604 722 1071</td> </tr> </table>	Glen Young	604 562 7492	Brad Marchant	604 889 0119	Larry Crebo	604 722 1071
Glen Young	604 562 7492						
Brad Marchant	604 889 0119						
Larry Crebo	604 722 1071						
Updated:	May 15, 2020						

SPLBC EQUIPMENT OPERATING INSTRUCTIONS							
Description:	Husqvarna Lawn Mower TRAINING REQUIRED						
Fuel Type:	Chevron 94 gasoline ONLY						
Oil Type:	4-cycle Lawn Mower Oil - SAE 30						
Starting Procedure:	<p>Clean area around fuel filler cap</p> <p>Check fuel level - fill to below the fuel spout level DO NOT over-fill !!</p> <p>Check oil level - be sure to clean around the oil fill cap before removing the cap</p> <p>Add small amount of 4-cycle Lawn Mower Oil SAE 30, <u>if dip stick shows no oil</u></p> <p>Oil level should be at the top of the hatch marks on the dip stick</p> <p>Connect grass-catcher bag</p> <p>Turn on fuel line</p> <p>Hold auto-shutoff handle</p> <p>On a level surface - slowly engage the pull cord, Pull to start 3 to 4 times</p> <p>If mower doesn't start, repeat 3 to 4 pull starts (check if fuel line is "OPEN")</p> <p>If more than 3 or 4 pulls are required - contact a Shop Volunteer (see list below)</p>						
Cleanup Procedure:	<p>Release auto-shutoff handle - mower will stop running</p> <p>Turn off fuel line</p> <p>Remove grass-catcher bag, empty and brush clean</p> <p>Brush debris from top of mower</p> <p>Wash undercarriage using the hose quick-connect fitting located on the mower cowl</p> <p>DO NOT !! - turn the mower over to clean the undercarriage and blade</p>						
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SPLBC EQUIPMENT OPERATING INSTRUCTIONS							
Description:	Stihl BR450 Backpack Leaf Blower TRAINING REQUIRED						
Fuel Type:	Two-Stroke Fuel Mix ONLY (50:1 fuel:oil mix)						
Oil Type:	Stihl Heavy-duty two stroke motor oil or equivalent						
Starting Procedure:	<p>Clean area around fuel filler cap</p> <p>Check fuel level - fill to below the fuel spout level DO NOT over-fill !!</p> <p>DO NOT add fuel when the engine is hot !!</p> <p>Move the throttle lever to "I" position</p> <p>Press the manual priming bulb 8 to 10 times (even if there is fuel already there)</p> <p>Engine is cold: push choke knob in and turn shutter lever to the "closed" position <i>(Engine is warm: No choke or priming is required)</i></p> <p>BEFORE STARTING - stand at least 3 m from others or objects that could be affected</p> <p>On a clean, level surface and firm footing - Pull the start cord slowly until it engages</p> <p>Pull with a short brisk, strong motion 3 to 4 pulls</p> <p>Let engine run for a few seconds</p> <p>Press and hold the throttle lever briefly- this will reset the choke to "open" position <i>[If the engine stops when you press the throttle - restart with choke in "open" position]</i></p> <p>If more than 4 pulls required - try the choke in the "open" position for 3 more pulls <i>[If the engine stops quickly - set the throttle lever half way to full throttle then try again]</i></p> <p>Let the engine run for 10 to 15 seconds at idle before using at full throttle</p> <p>If it still doesn't start - contact a Shop Volunteer (see list below)</p>						
Cleanup Procedure:	<p>Run the machine for 10 to 15 seconds at full throttle before stopping</p> <p>Move the throttle lever to "0" position, machine will stop</p> <p>Brush debris from the machine</p>						
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SPLBC EQUIPMENT OPERATING INSTRUCTIONS							
Description:	Stihl BG50 Leaf Blower TRAINING REQUIRED						
Fuel Type:	Two-Stroke Fuel Mix ONLY (50:1 fuel:oil mix)						
Oil Type:	Stihl Heavy-duty two stroke motor oil or equivalent						
Starting Procedure:	<p>Clean area around fuel filler cap</p> <p>Check fuel level - fill to below the fuel spout level DO NOT over-fill !!</p> <p>DO NOT add fuel when the engine is hot !!</p> <p>On a clean, level surface:</p> <p>Set the STOP switch to the "ON" position</p> <p>Slowly press the manual gas priming bulb 5 times</p> <p>Set the choke shutter lever to "<u>closed</u>" position</p> <p>Squeeze the throttle trigger fully</p> <p>Pull the start cord slowly until it engages</p> <p>Pull the start cord sharply until engine starts</p> <p>After a few seconds set the choke lever to the "<u>open</u>" position</p> <p>[If engine stops right away - repeat with choke in OPEN position]</p> <p>[If engine does not start - repeat with choke in OPEN position]</p> <p><i>(Engine is warm: No choke required, no bulb priming required)</i></p> <p>If it still doesn't start - contact a Shop Volunteer (see list below)</p>						
Cleanup Procedure:	<p>Run the machine at full throttle for 10 seconds before stopping</p> <p>Move the STOP switch to the "OFF" position</p> <p>Brush debris from the machine</p>						
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SPLBC EQUIPMENT OPERATING INSTRUCTIONS							
Description:	Homelite String Trimmer TRAINING REQUIRED						
Fuel Type:	Two-Stroke Fuel Mix ONLY (50:1 fuel:oil mix)						
Oil Type:	Stihl Heavy-duty two stroke motor oil or equivalent						
Starting Procedure:	<p>USE ONLY Homelite <u>.08"</u> string assembly and replacement string</p> <p>Push the spool retainer down while pulling on string leads to lengthen strings OR - with engine at full throttle, tap spool on hard flat surface to advance string</p> <p><u>String replacement - refer to demo</u></p> <p>Set the unit on its side so the fuel filler cap is pointing upward Clean area around fuel filler cap Check fuel level - fill to below the fuel spout level DO NOT over-fill !! DO NOT add fuel when the engine is hot !!</p> <p>On a flat, clean surface: Slowly press the manual gas priming bulb 5 times Set the choke lever to "A" position (full choke) Squeeze the throttle trigger fully Pull the start cord slowly until it engages Pull the start cord sharply 3 to (max) 5 times until engine starts Allow engine to run a few seconds - set choke to RUN position [If engine does not start - repeat with choke between "A" and "RUN" position] [If engine stops right away - repeat with choke in RUN position]</p> <p><i>(Engine is warm: No choke required, no gas bulb priming required)</i></p> <p>If it still doesn't start - contact a Shop Volunteer (see list below)</p>						
Cleanup Procedure:	<p>Run the machine at full throttle for 10 seconds before stopping Press the STOP switch to the "OFF" position Brush debris from the machine</p>						
Shop Volunteers:	<table border="0"> <tr> <td>Glen Young</td> <td>604 562 7492</td> </tr> <tr> <td>Brad Marchant</td> <td>604 889 0119</td> </tr> <tr> <td>Larry Crebo</td> <td>604 722 1071</td> </tr> </table>	Glen Young	604 562 7492	Brad Marchant	604 889 0119	Larry Crebo	604 722 1071
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Updated:	May 15, 2020						