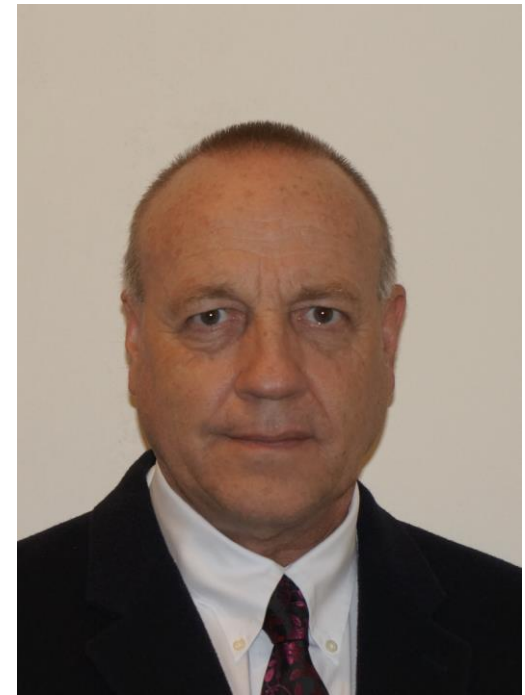


June 14, 2023  
Town Planning Board

Presented by  
Darryl Koster  
Courses Manager  
Hong Kong Golf Club

## Who is Darryl Koster?



### PROFESSIONAL EXPERIENCE

Golf Course Superintendent/Construction Superintendent

International Experience

Construction Projects (Start to Finish)

Renovation Projects

Grow-In's

Landscape Fit Outs

Volunteer - Augusta National - "The Masters"

President - South China Turfgrass Managers Association

43 years / 12 clubs

39 years

7 projects

5 projects

11 projects

7 projects

2015

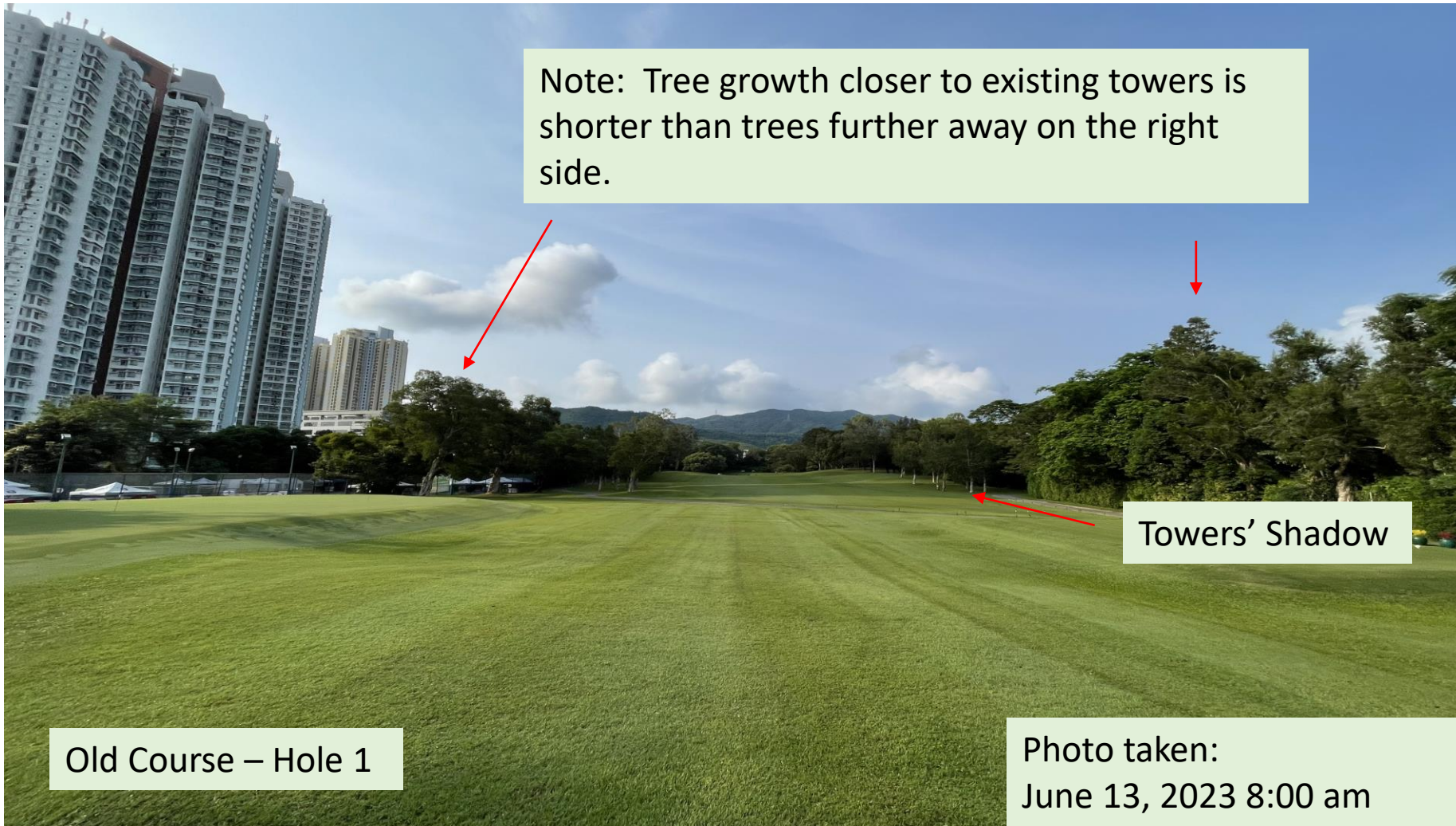
2014-2017/2023

Today's topics will focus on both Turfgrass and Landscaping

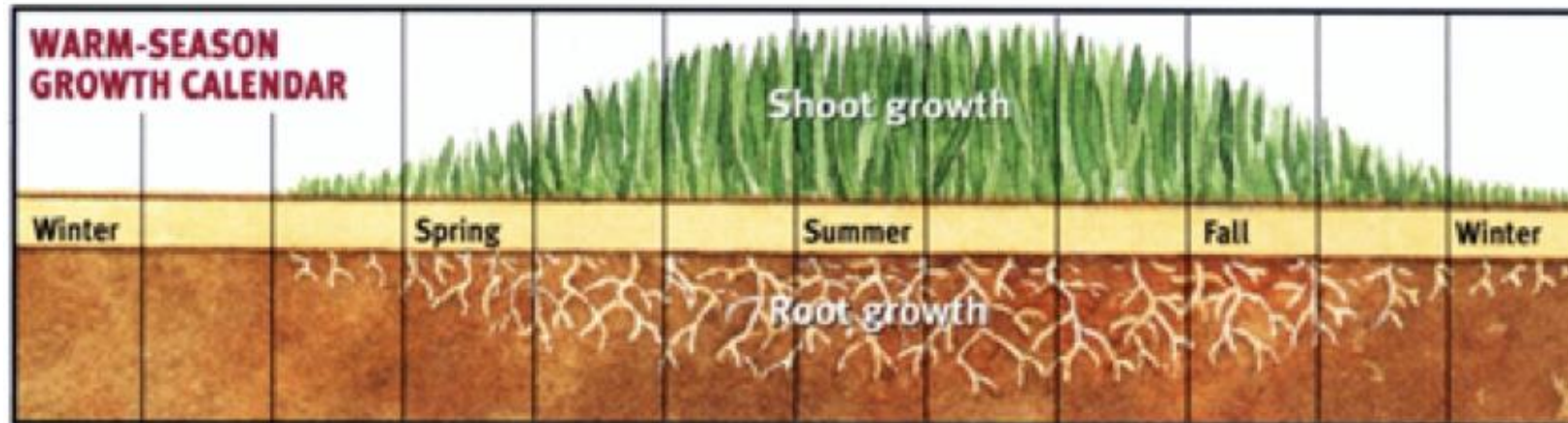
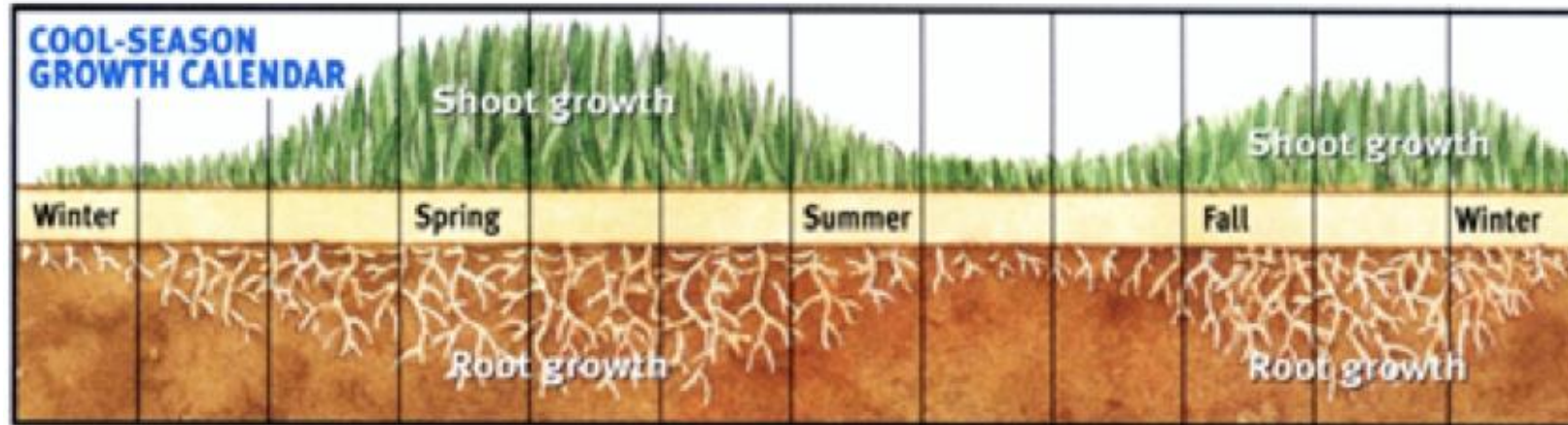
- Requirements for Quality Turf
- Benefits from Turf and Landscape
- Equipment and Maintenance Requirements
  - Key Facts about the 32 hectares

# Shading Impact to Trees/Turfgrass

The impact of high rise buildings adjacent the golf course are already having a noticeable affect on the overall landscape quality as a result of reduced sunlight hours. With turfgrasses, the impact will be immediately (within one week's time on the greens), where the trees, landscape and ground covers will be affected over a longer period of time.



- **Turfgrass Type** -Turfgrasses planted on the golf course, and also utilized at other golf courses in Hong Kong are classified as warm season grasses, and require a minimum of 8-10 hours of sunlight per day to grow at their optimum.
  - Experience shows 5 hours of morning sun and 5 hours of afternoon provide the adequate amounts.
  - It's important to remember that the color and intensity of the light spectrum changes throughout the day. Dawn produces blue rays.....mid morning to late afternoon red rays.....and green as the sun is setting. The red rays are what favors photosynthesis.
  - Blocking of the sun results in few red rays, thus leading to less photosynthesis.



- **Time of Year** – with the proposed location of the towers, the shadowing effect will vary pending on the time of year.
  - Winter Solstice – more areas will be cast with shade.
  - Summer Solstice – less areas affected with shade. But it's important to remember even during the summer, shadows are still present in certain locations throughout ½ the day.



**Figure A1-03 – Sun Path Diagram – Winter Solstice – 1000 hrs**



Shadow Outline

**Figure A1-25 – Sun Path Diagram – Summer Solstice – 1000 hrs**

## Locations Affected

Old Course 18 Fairway – the turf's health will quickly subside, particularly during the winter months.  
This area is used for staging the entertainment events during international events.



Weak Turf

Shadows

Photo taken: June 13, 2023 – 8:00 am



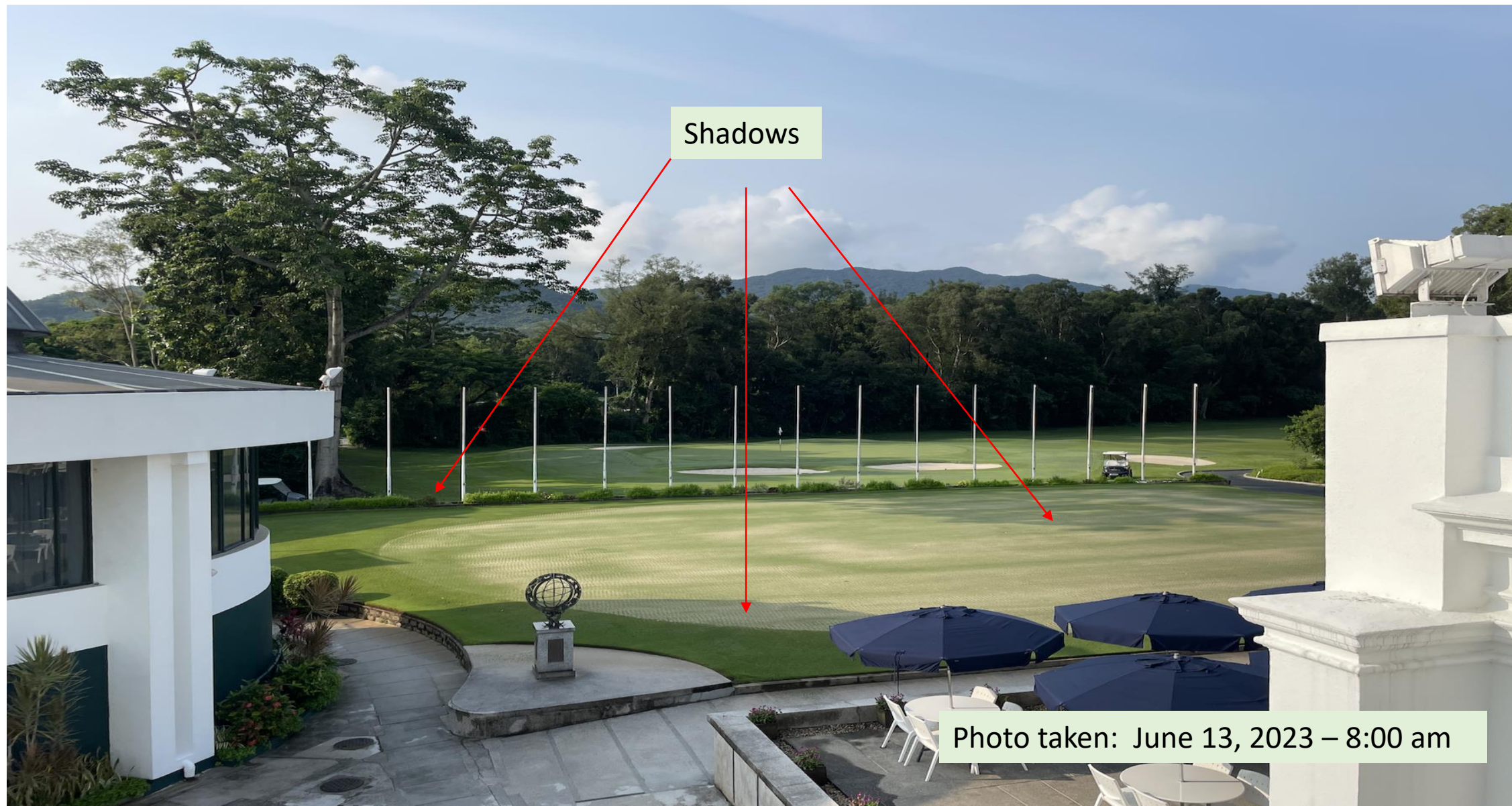
Old Course 18 Green – the turf’s health will quickly subside, particularly during the winter months. This area is used for staging the entertainment events during international events.



Shadows

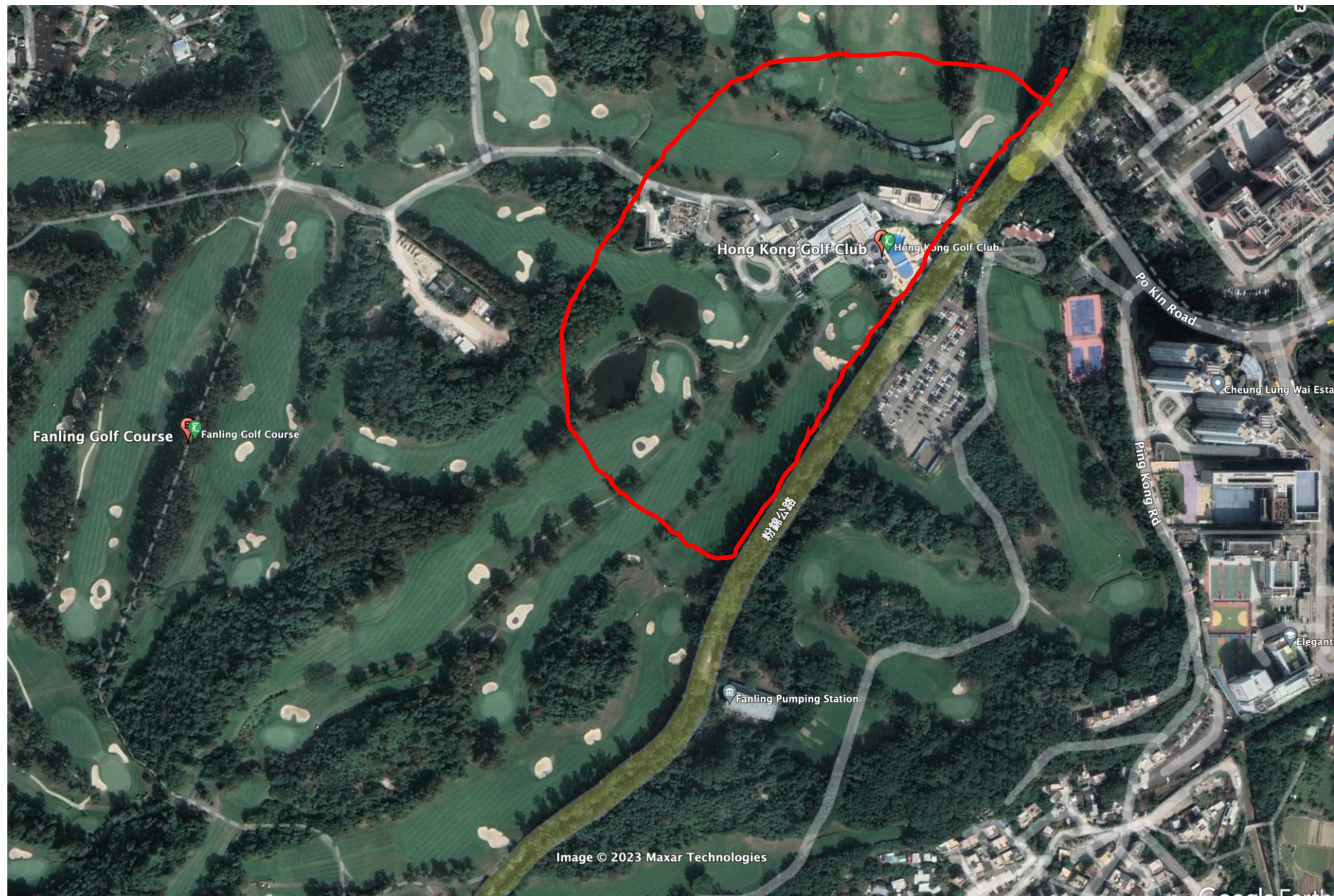
Photo Taken: June 13, 2023 – 8:00 am

Practice Putting Green – the turf’s health will quickly subside, particularly during the winter months. This is the primary putting green used during all international events.



Other Areas Affected – All these areas are part of the composite golf course used for international events....but just as important used on a daily basis by the members and public golfers.

- Eden Hole 1 Green and Fairway
- Eden Hole 7 Green and Fairway
- Eden Hole 18 Green
- New Hole 1 Tee and Fairway
- Driving Range
- New 18 Green



## Other important facts:

- Sunlight is only one part of the complete equation for turfgrasses and landscape to grow at their optimum.
- Best turfgrass results in Hong Kong occur during the months of mid October to end of December. During this period cloudy days are infrequent or non existent, allowing the turfgrass to capture a full day's sunlight. This is when the Hong Kong Open is traditionally schedule.
- Golf Courses are not parks or forest. The light requirement is far less and different for trees, shrubs and ground covers vs. turfgrass.
- Reducing the sunlight to the plant directly affects the health, and leads to a slow death....which leads to other issues.
- Trees and turfgrass are both valued and can co-exist on golf courses, but trees must be pruned and cropped to allow adequate sunlight to the turfgrass.
- The turfgrasses used and maintained throughout the golf course are of a special genetic breed, adapted to shorter cutting heights and denser canopies designed to provide the best playing surface for the regular golfer and professional ranks.

# Impact of Poor Air Movement on Turfgrass

- Any structures such as buildings or landscape do have an impact on the plants health.
- Sunlight is a key element required for the plant's health.
- All living plant material breaths, through pores on the leaves and trunks.....when the air is stagnant the oxygen is reduced thus putting the plant under stress.
- During such circumstances the plant over heats, and/or is stressed to a point its immunity defensive system can't cope to fight off disease pathogens.



# On a Personal Note:

Throughout my agronomy career I've had the opportunity to have worked in the following countries:

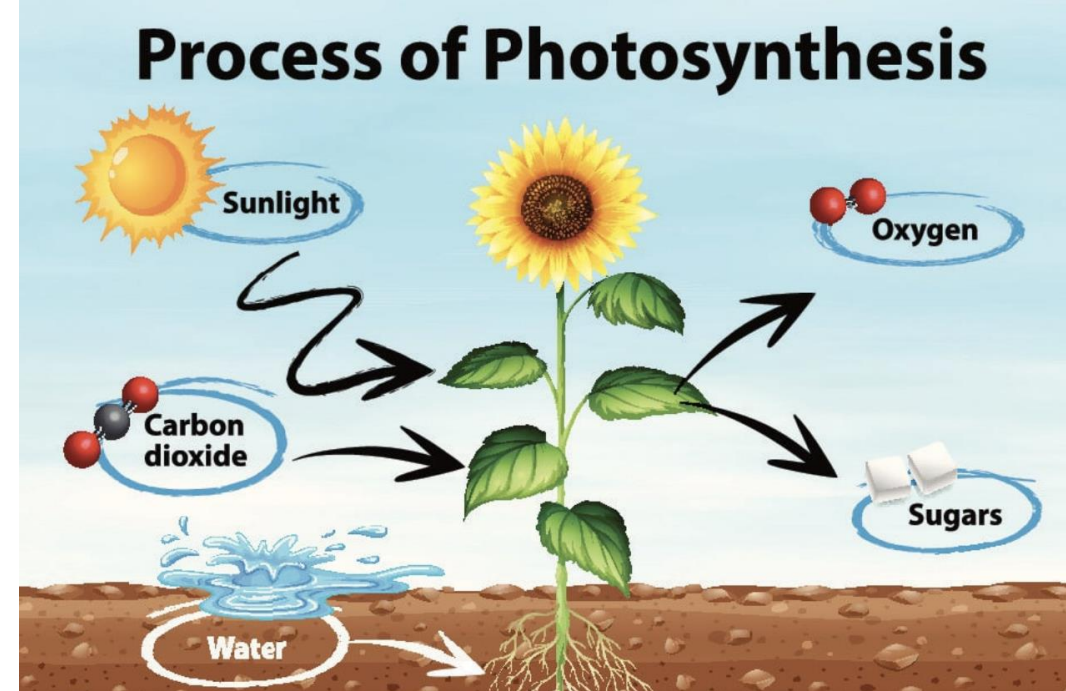
1. USA
2. Thailand
3. Hong Kong
4. Singapore
5. Indonesia
6. Japan
7. Korea
8. Mexico

.....and by far the most difficult country to grow and maintain turfgrass was in Hong Kong. Why?  
Because of the limited amount of sunlight.

# Benefits of Turfgrass/Trees

# The Air We Breathe

1. Healthy landscape absorbs carbon dioxide from the air and replaces it with oxygen.
2. A 230 m<sup>2</sup> area of turfgrass produces enough oxygen per day for a family of four. Assume 1/3 of the 32 hectares is replaced with concrete (9.6 hec. or 96,000 m<sup>2</sup>) / 230 m<sup>2</sup> = 417 people.
3. In one year, one average size tree will absorb 22 kg of Carbon dioxide.
4. Landscape transpires water into the air, increasing humidity and decreasing pollutants.
5. Landscape helps improve air quality by storing carbon and absorbing ozone.





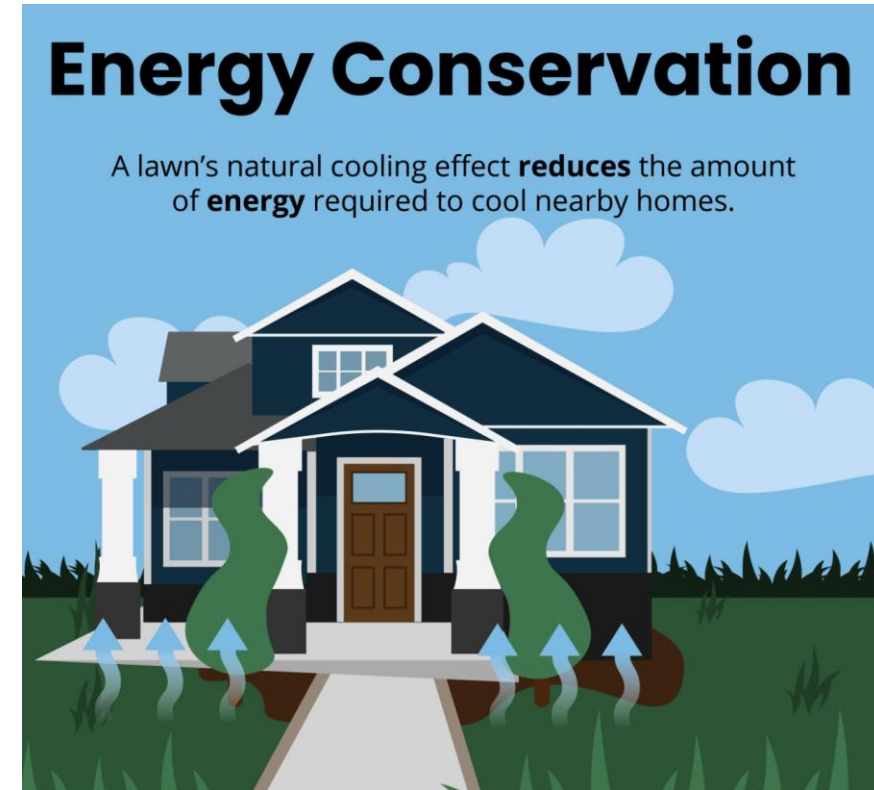
## Erosion Control

1. Grass/Tree roots are very effective at binding soil.
2. Grass controls runoff by slowing water velocity, allowing it to soak into the soil.
3. Roots increase water storage capability by loosening the soil and adding organic matter.
4. Root systems also penetrate and hold on to soil, trapping essential nutrients.



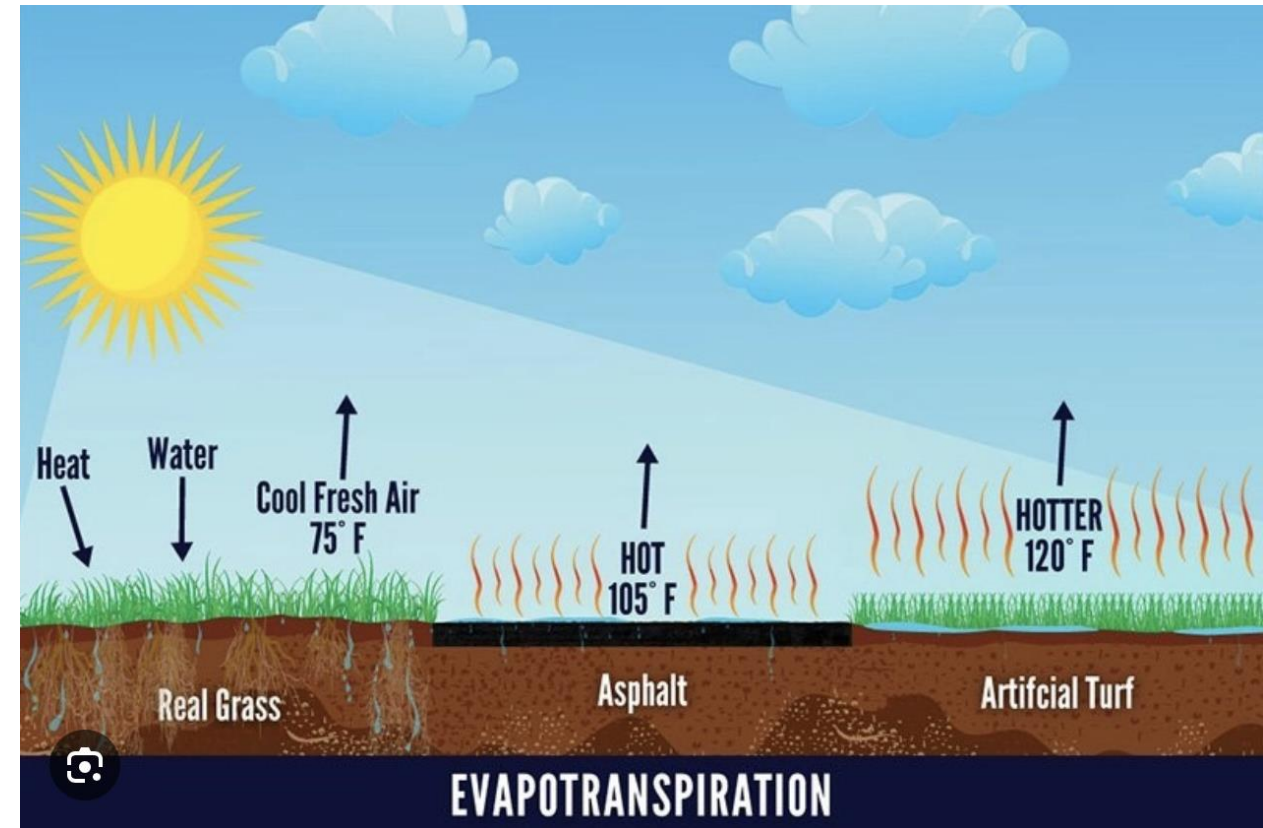
# Energy Conservation

1. Turfgrasses, shrubs and trees cool the air by absorbing solar radiation and through a process called evapotranspiration.
2. The cooling effect of grass can lower air conditioner usage, thus reducing pollution and energy costs.
3. Landscape reduces energy usage on a national level due to its cooling effect on the environment.



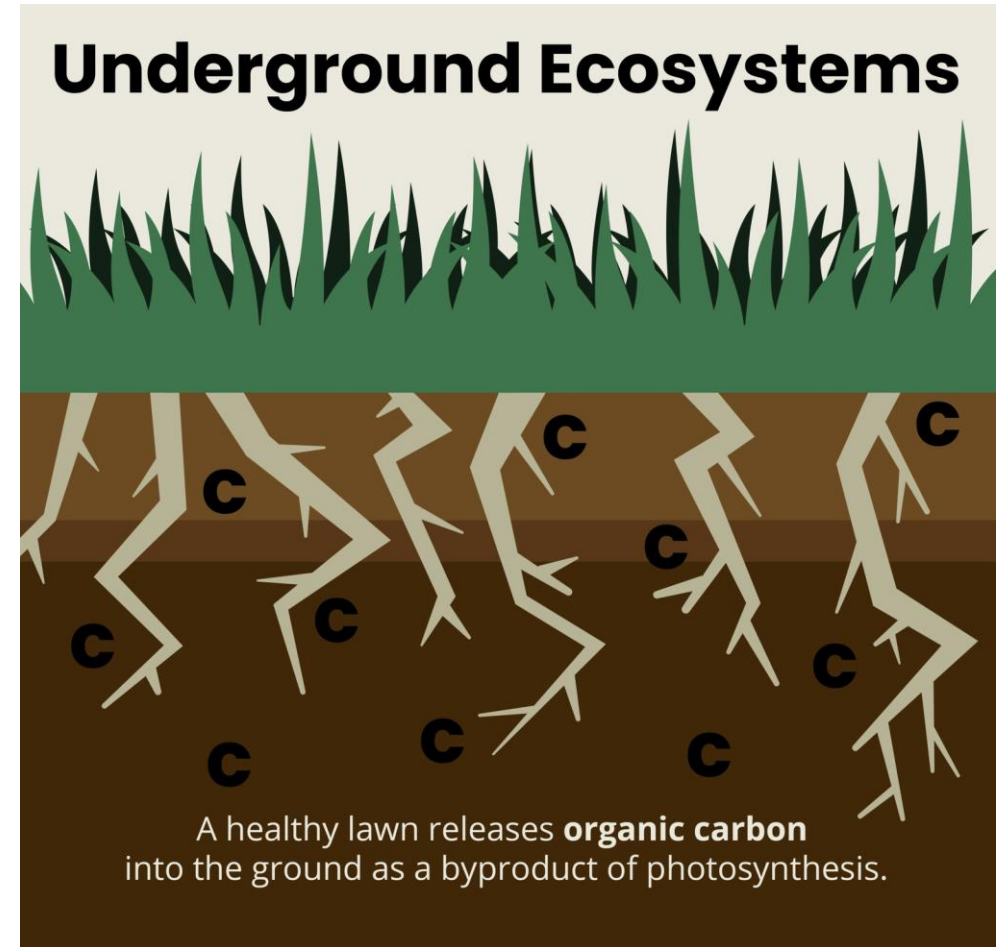
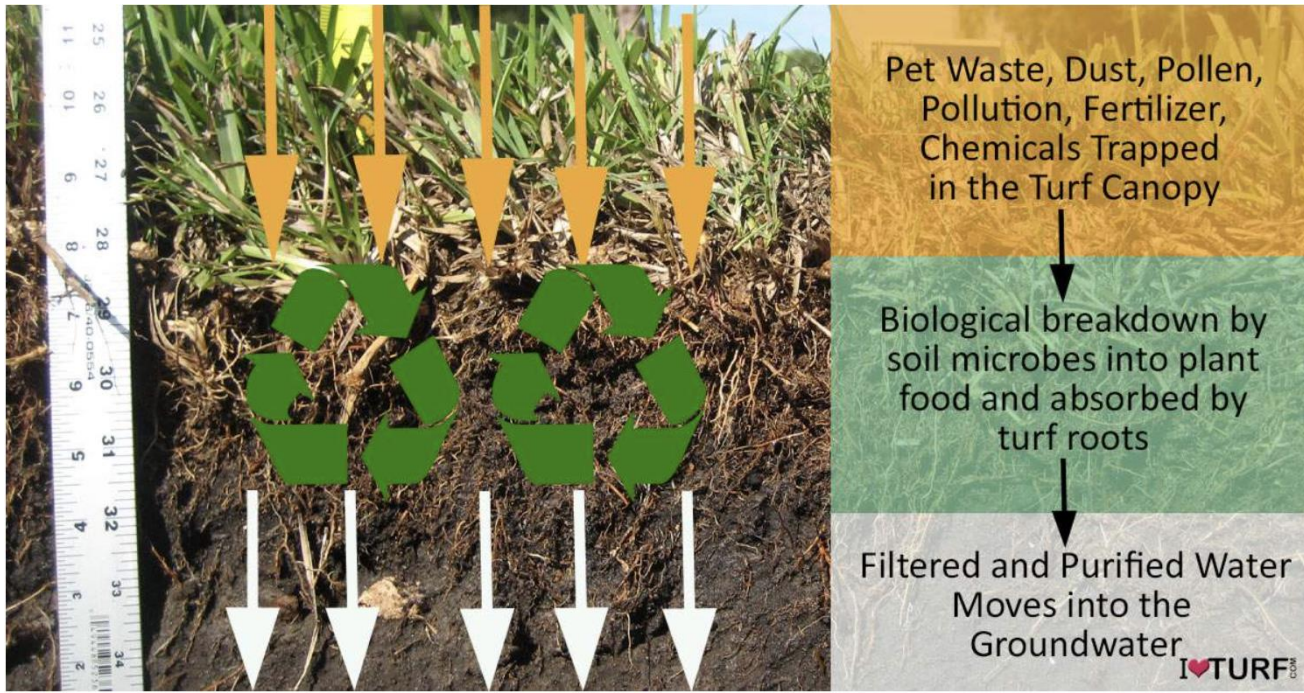
# Temperature Modification

1. The average city temperature is hotter because buildings and streets hold heat overnight (the urban heating effect).
2. On a summer day, a sidewalk temperature might reach well above  $40^{\circ}\text{C}$ , whereas a lawn surface might remain at around  $24^{\circ}\text{C}$ .
3. Landscape is an evaporative cooler, which is why grass temperatures are an average of  $15^{\circ}\text{C}$  cooler than asphalt and concrete.



# Water Purification and Conservation

1. The biology of landscape soils turns soil profiles into a perfect natural water purifier.
2. Water travels into underground aquifers via the turf's root zones.
3. Soil microbes break chemicals down into harmless materials—including turf pesticide.
4. The root zones of thick, healthy lawns help clean passing waters and reduce runoff to nearly zero.



# Allergy Control

1. Mowed turfgrass helps control seeds and spores, dust pollen from weeds and populations of stinging and biting insects.
2. Turfgrass areas must be well-maintained, any bare areas allow weed seeds to germinate causing allergy problems.
3. Some weeds, like Clovers, attract bees, whose sting can produce allergic reactions.



# Beauty Appeal

1. Trees/turfgrasses serve as the perfect canvas for landscaping creativity and excellence.
2. Healthy landscape makes and completes an inviting setting for the whole family.
3. Turfgrasses organize and pull together all of the landscaping components, providing visual coherence.
4. Manicured trees/turf are the first thing people see when walking up to a golf course, giving a first impression that conveys hospitality and warmth.



Old – Hole 6

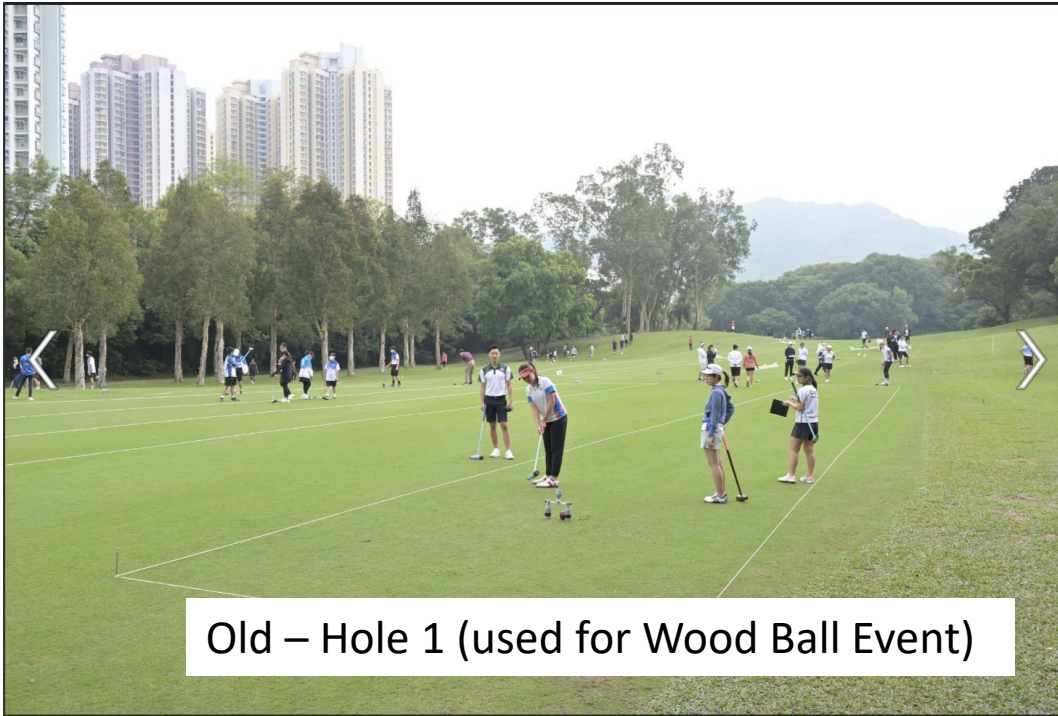
# Noise and Glare Reduction

1. Noise and glare are both reduced by the surface characteristics of landscape.
2. Turfed areas are far superior at absorbing sounds than bare ground, gravel, pavement and other hard surfaces. Studies show a reduction of 20-30% noise vs. hard surface.



## Recreation

1. Turfgrass offers a low-cost way to provide safe recreational surfaces for kids and adults.
2. Family picnics, adult gatherings and backyard sports are all bonding experiences.
3. Quality parks and sports fields can build community pride and provide endless interest and entertainment.
4. Recreational activities and leisure time spent on turfgrasses can improve mental and physical health, something that's vital to modern society—especially in densely packed urban centers.



Old – Hole 1 (used for Wood Ball Event)



Old – Holes 1 to 4 (used for Cross Country Running Event)



## Recreation and Hong Kong Golf Club .... and its contribution to the Sporting/Health Scene in Hong Kong:

- 1) **International Golfing Events** – in 2023, 3 events will be hosted by the club.
- 2) **Local Society Golf Events** – many golf societies use the golf courses on a regular basis.
- 3) **Cross Country Events** – the Hong Kong high schools hold 3 events per year, using a layout routed through Old Course holes 1-4 fairways.
- 4) **Hong Kong Wood Ball Events** – the local teams practice on a regular basis, and 2-3 times a year for competitive events. All these activities occur on the Old Courses holes 1-4 fairways.
- 5) **Doggy Days** – several times a year, the public is welcomed to the Old course for a day to enjoy time with family and their dogs.
- 6) **Open House Days** – several times a year, the general public is invited to enjoy the park like scene on the Old course with various activities arranged for the attendees to partake in.
- 7) **Jogging Trail** – on a daily basis a part of the Old course is closed allowing joggers/walkers to enjoy a 1.5 km hard surfaced lit trail.
- 8) **Night Safari Events** – throughout the year tours are arranged for the public to view and listen to professionals point out the club's fauna and flora.
- 9) **Ecological Tours** – on a monthly basis the public is invited to join environmental professionals to tour the courses speaking about the flora, fauna, heritage buildings, bee farms and butterfly gardens.

Bear in mind all these events happen for the fact, the facility provides high standard landscape conditions throughout the year.

To maintain Old Course holes 1-8, to the same present standard, would require the following:

1. Supportive Infrastructure
2. Well Trained Staff
3. Proper Equipment
4. Consistent Maintenance Programs

<b>Necessary Infrastructure Requirements</b>		
	<b>Area</b>	<b>Estimated size (m2)</b>
1	Maintenance Facility	
	Office Staff	75
	Staff Showers/Toilets/Lockers/Canteen	75
2	Equipment Workshop	150
3	Pesticide Storage	50
4	Fertilizer Storage	75
5	Spare Parts/Golf Accessory Store	100
6	Equipment Storage	300
7	Tool Storage (daily small tools)	25
8	Fuel Station (diesel/benzine with underground tanks)	20
9	Sand Storage	300
10	Turf/Landscape Nursery	200
11	Irrigation Pump House	60
12	Staff Car Parking	150
13	Concourse	400
		1,980
Others	Irrigation Distribution System	
	Pond Enlargement for Water Source	
	Electrical Sub Station (power supply for various buildings/infrastructure)	
	License/Permits (Pesticides/Fuel/Workshop/Landscape)	

Infrastructure Requirements

Estimated Cost for Set Up:  
\$30 - 40 million

<b>Summary of Equipment Required</b>	
1	4 Greens Mowers
2	10 Utility Vehicles
3	1 Roller (small)
4	2 Tee Mowers
5	2 Fairway Mowers
6	2 Rough Mowers
7	2 Blowers
8	1 Triplex Machine
9	2 Top Dressing Machines
10	1 Loader
11	2 Spray Units
12	2 Fertilizer Spreaders
13	2 Edgers
14	2 Aerifying Machines
15	2 Utility Vehicles
16	1 Tractor (50 hp)
17	1 Verticutting Machine
18	1 High Lift
19	1 Trailor
20	Hand Tools
21	Workshop Equipment

## Maintenance Equipment Requirements

Estimated Cost for Equipment:  
\$10 – 15 million

## Daily Tasks Required to Open the Course for Play

Item No.	Daily Tasks	Equipment Required by Tasks	Staff Required
1	Mow Greens	3 Greens Mowers	3
		3 Utility Vehicles	
		1 Roller	
	Roll Greens	1 Utility Vehicle	1
		1 Utility Vehicle/Water Hose	
2	Mow Tees	2 Tee Mowers	2
		2 Utility Vehicles	
3	Mow Fairways	2 Fairway Mowers	2
4	Mow Roughs	2 Rough Mowers	2
5	Rake Bunkers	2 Utility Vehicles	2
6	Change Cups	1 Utility Vehicle	1
7	Check Water Stations/Empty Rubbish Bins/Fill Divots	1 Utility Vehicle	2
		2 Blowers	
8	Check Landscape	1 Utility Vehicle	1
9	Check Irrigation System	1 Utility Vehicle	1
	<b>Total</b>		<b>18</b>

## Weekly Tasks Required to Maintain the Course to Best Standard

	<b>Weekly Tasks</b>	<b>Equipment Required</b>	<b>Staff Required</b>
1	Verticut Greens/Green Surrounds	1 Triplex Machine	1
	Top Dress Greens/Green Surrounds	2 Top Dressing Machines	2
		1 Loader	
	Spray Greens (Fertilize/Pest Control)	1 Spray Unit	1
2	Verticut Tees	1 Triplex Machine	1
	Top Dress Tees	2 Top Dressing Machines	2
		1 Loader	
	Spray Tees (Fertilize/Pest Control)	1 Spray Unit	1
3	Spray Fairways (Fertilize/Pest Control)	1 Spray Unit	1
4	Edge Bunkers	2 Utility Vehicles	2
		2 Edgers	

## Annual Tasks Required to Maintain the Course to Best Standard

	<b>Annual Tasks</b>	<b>Equipment Required</b>	<b>Staff Required</b>	<b>Frequency/Year</b>
1	Aerify Greens/Green Surrounds	2 Aerifying Machines	4	6
	Clean Greens after Aerifying	2 Utility Vehicles	4	6
	Top Dress Greens (heavy)	2 Top Dressing Machine	2	6
	Roll Greens	1 Roller	1	6
		1 Utility Vehicle		
2	Aerify Tees	2 Aerifying Machines	2	6
	Clean Tees after Aerifying	2 Utility Vehicles	4	6
	Top Dress Tees (heavy)	2 Top Dressing Machine	2	6
3	Aerify Fairways	1 Aerifying Machines	1	6
	Tractor (45 hp)	1 Tractor		
	Verticut Fairways	1 Verticutting Machines	1	6
	Clean Fairways after Aerifying/Verticutting	2 Utility Vehicles	2	6
4	Add Sand to Bunkers (15 bunkers)	3 Utility Vehicles	3	1
5	Projects - Repair Paths/Plant Turf/	5 Utility Vehicles	10	Year Round
6	Prune Trees	5 Utility Vehicles	8	Year Round
		1 Lift	1	Year Round
7	Clean Ponds	1 Utility Vehicle	1	Year Round
8	Emergency Work (after storms)	10 Utility Vehicles	10	Typhoon Season

Estimated Annual Maintenance Budget for Old Course Holes 1-8 - \$10 million

To ensure these 8 holes are maintained to the level they are now, experienced and knowledgeable landscape personnel would be required.



Key facts to know about the 32 hectares

The fairways are constructed on a 200 mm thick sand cap, reducing surface runoff. The Old course is the only golf course in Hong Kong with a pure sand profile.



A modern underground irrigation system, using recycled treated water, supplies water for all the turf/tree areas.



The two ponds support both water plants and various species of crabs and other reptiles. One of the ponds, at hole 7, acts as a primary catchment for surface water from Fan Kam road.



It has the rarest trees (the Chinese Swamp Cypress) which have existed for over 150 years on hole 7. In addition the area contains other Heritage, OVT and TPI tree specimens.



Community Outreach Program provides villagers daily access to play the golf course.



# Lighted Walking Trail – open to the public



# “In Conclusion”

## **1 million residents have no access to sports grounds in Hong Kong, report shows, in call for more user-friendly facilities**

- Audit Commission’s report reveals city is estimated to lack 4.6 sports grounds, based on provision standard of one per 250,000 residents
- Average usage rate of sports grounds reached 99 per cent annually from 2016 to 2020, with joggers accounting for more than 80 per cent of total usage



Thank you



Old – Hole 4