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Study of Water Stagnant in Golf Driving Range

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Abstract: Water stagnant due to heavy rainfall is one of the problem that could be avoid with designing the drainage and levelling the land surface properly. The research had been carried out to helping the responsible department in University Tun Hussein Onn Malaysia (UTHM) which is Pejabat Pembangunan dan Penyenggaraan (PPP). The method that use in this research are levelling, traverse and tacheometry. For the levelling method, it was to obtain the different level of surface in golf driving range. Method of traverse in this research to determine the boundaries of golf driving range and the method of tacheometry is to obtaining the topographic plan and mapping of golf driving range. Automatic levelling equipment and total station were use in this research. In this study, AutoCAD and SDR Mapping and Design software is applied to produce topographic plan in golf driving range UTHM. The result of this study shows the area of highest and lowest level in golf driving range. The highest point level in study area is 99.908 and the lowest level is 99.302. From the analysis that has been done, the caused of water stagnant in golf driving range is the surface of area had different level and the water run-off were accumulate at the lowest level. The suggestion to solve this problem are to carry out the land reclaimation at the lower level and redesign the drainage in golf driving range.

Keywords: Water Stagnant, Gridline Leveling

1. Introduction

Malaysia is located at the equator that have two seasons which is hot and rains all year round. According to Malaysian Meteorological Department, Malaysia has high humidity climate, the high rate of rainfall and also has uniform temperature. Raining normally give the advantage to the living things in the earth but continuous raining was give disadvantage such as stagnant water that can cause flooding in that area [1].

Flooding are the natural disaster that occur due to the climate in Malaysia like continuous rain or river water overflowing to the riverbank or both of it [2]. Effect of the flood, the country will losses in

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terms of property, money and lives. Heavy rain also may cause water stagnant in the low level area. The situation of water stagnant is when the rainfall accumulates and cannot flow to the nearest drainage. The causes of this flood can be classified into two parts namely natural and man-made. Naturally, floods can occur due to heavy rainfall prolonged, high tide and low terrain condition [3].

Water stagnant also happened in the area of golf driving range at University Tun Hussein Onn Malaysia (UTHM). There were lot of activities in golf driving range which is golf, archery and petanque. The location of lapang sasar are between the E14 building and badminton hall and this area often becomes water stagnant during the heavy rain and it give the problem to communities. This study is to produce the profile and topography golf driving range and suggest the solution to overcome the water stagnant problem.

2. Equipment and Methods

In order to ensure accurate results and can be used by responsible party, the equipment and method that were used must be scrutinized.

2.1 Equipments

Equipment that was used in this research were total station and automatic leveling. Total station is one of the equipment that widely used to perform engineering survey. In this study, the total station were used for traverse to set up the boundaries around the study area [4] and tacheometry to collect all the features in the study area while the automatic levelling were used to perform the ground level.

To completed this study, SDR Mapping and AutoCAD software were used to process the data. SDR Mapping were used by engineer in designing for the construction such as road, cut and fill [5] while for AutoCAD software widely used in mapping, architecture and geology field [6].

2.2 Methods

Method that used in this research are traverse, levelling and tacheometry. For traverse survey, four (4) points was set which is station 1, station 2, station 3 and station 4 as shown in Figure 1. This method start and end at the same point which is station 1 [7].

Figure 1: Station for traverse

After establish the traverse survey, the next process were perform levelling. The levelling survey that has been done is by using the gridline as shown **Figure *2***. Gridline method was choosen because of the ability to produced a very accurate level at the certain point but it was not suitable for the wide area [8]. All the grid point in golf driving range was marked by wooden pegs and the height of each pegs was observed by using staff and automatic levelling equipment.

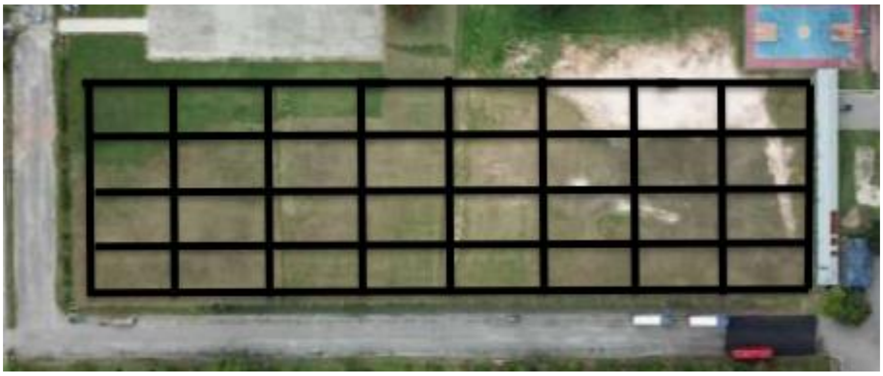

Figure 2: Gridline for levelling in Golf Driving Range

The detailed information around the golf driving range, was collected by using tacheometry method. The data that collected at study area was the permanent object in golf driving range which is building, petanque field, drain and road. All of the data from this field work were processed by using SDR Mapping and AutoCAD software.

3. Results and Discussion

After completed the fieldwork, data processing has been done. The result were discussed regarding the different height level of golf driving range. The data were collected by using three method of surveying.

3.1 Travese

Observation data traverse that has been established at golf driving range then were processed by using SDR Mapping software. After the processing of data traverse, it was found that this traverse were fulfill criteria for the second class where the precision is 1:33032.53. As a result of this processing, plan of golf driving range were produced as shown in Figure 3. In this plan and Table 1, it shows the bearing and distance that have been observed at each point during the field work at golf driving range. For the coordinate, it was calculated by using the latitude and departure calculation. The data of latitude and departure were analysed by using the Bowditch method.

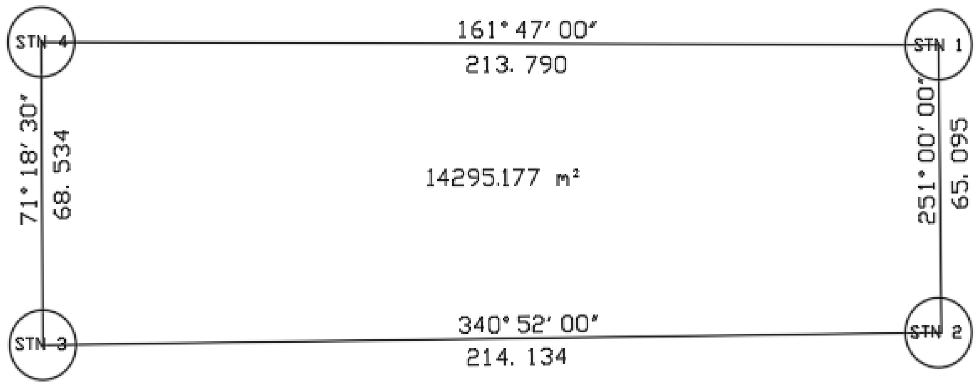

Figure 3: Boundaries of Golf Driving Range

Table 1: Data observation in traverse

Station		Bearing	Distance (m)	Coordinate	
From	To			U/S	T/B
1				1000.000	1000.000
	2	251° 00' 00"	65.095	978.807	938.449
	3	340° 52' 00"	214.134	1181.112	868.256
	4	71° 18' 30"	68.534	1203.075	933.173
	1	161° 47' 00"	213.790	1000.000	1000.000

3.2 Levelling

Levelling work with the method of gridline was carried out to obtain the height at each intersection point that had been marked in the golf driving range. The intersection gridline point were marked by wooden pegs. It was carried out based on the value of temporary benchmark that has been estimated at 100.00. The highest value that were observed during levelling work at golf driving range was 99.908 while the lowest level was 99.302 as shown at Figure 4. Water were flow from the high level to the low level and it were accumulate around it and become water stagnant due to different level surface.

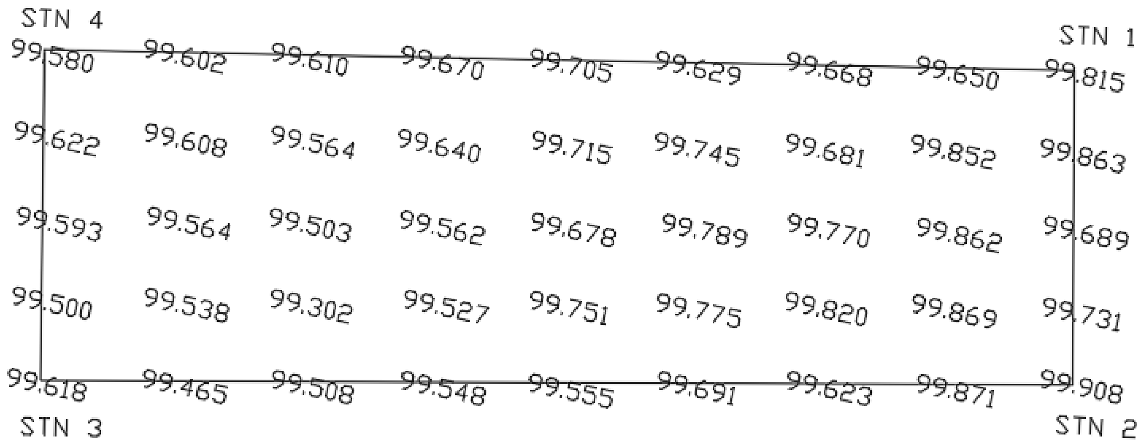

Figure 4: Value of grid point

3.3 Tacheometry

Tacheometry work that has been done at golf driving range were processed by using SDR Mapping software. After the result were obtained from SDR Mapping software, it was transferred to AutoCAD software to finalise the plan in golf driving range as shown at Appendix B. The topographic plan at golf driving range with the water direction flow show in Figure 5. In that plan, it contain 4 type of colour which is green for the highest level, yellow for high level, orange for low level and red colour as the lowest level. So, the water run-off were flowed from the green area to the red area and the water stagnant were occured.

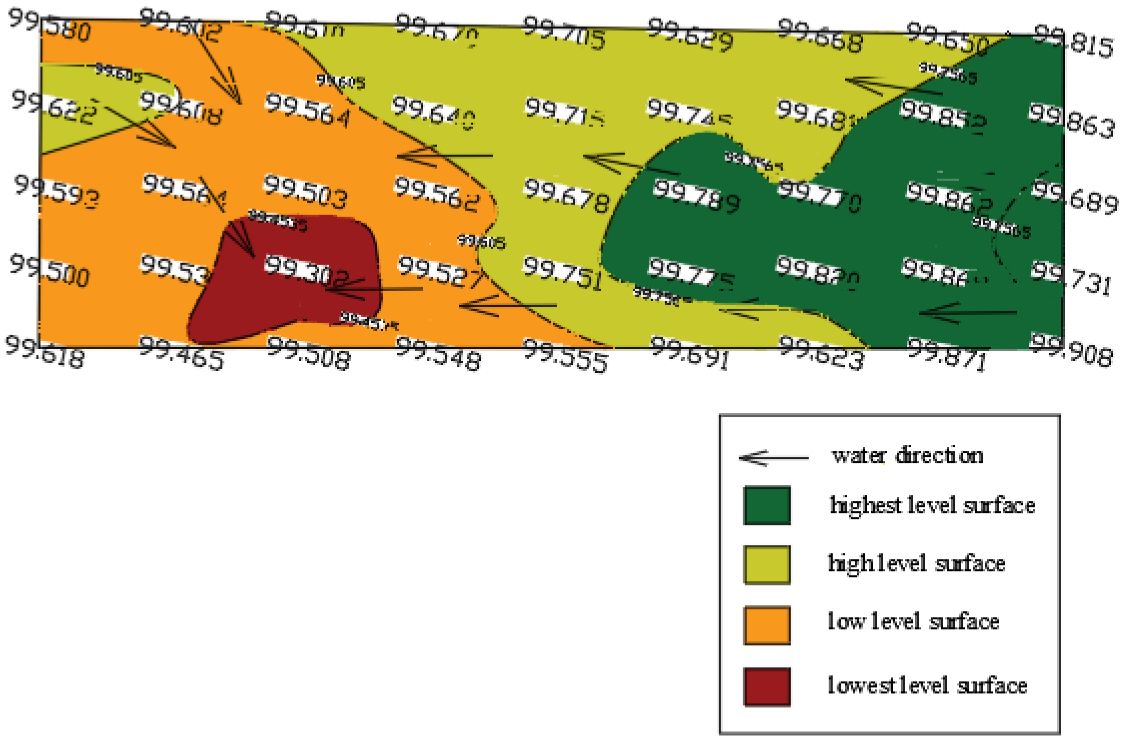

Figure 5: Contour in Golf Driving Range

4. Conclusion

From the analysis that has been conducted, it can be concluded that the existence of water in golf driving range due to heavy rain is caused of topographic surface that were uneven as shown in Figure 5. Water were mostly stagnant in the red areas. It is because this area were the lowest area in golf driving range. To overcome this problem, it is recommended to carry out the reclamation work at the lowest area which is marked with red colour and the golf driving range should be leveled so that all the area at golf driving range have the same height of level. It will prevent the occurrence of stagnant water from recurring. In addition, another recommendation that can be given is to ensure that the height of golf driving range is higher than the level of the drainage system around golf driving range so that water can flow to the drain. For the drainage, it is suggest to redesign the drainage system according to the water round-off during heavy rains.

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Appendix A

Table 2: Data of Latitude and Departure

Station		Bearing	Distance (m)	Latitude (+/-)	Departure (+/-)	Correction	
From	To					Latitude	Departure
1							
	2	251° 00' 00"	65.095	-21.193	(-0.002) -61.549	-21.193	-61.551
	3	340° 52' 00"	214.134	202.305	(-0.0065) -70.186	202.305	-70.193
	4	71° 18' 30"	68.534	21.963	(-0.0021) 64.919	21.963	64.917
	1	161° 47' 00"	213.790	-203.075	(-0.0065) 66.833	-203.075	66.827
			561.553	0	0.017	0	0

$$\text{Percision} = \frac{\sqrt{(Latit)^2+(Dipat)^2}}{Jumlah\ jarak}$$

$$= \frac{\sqrt{(0)^2+(0.017)^2}}{561.553}$$

$$= 1 / 3.0273 \times 10^{-5} \qquad = 1{:}\ 33032.53$$

Appendix B

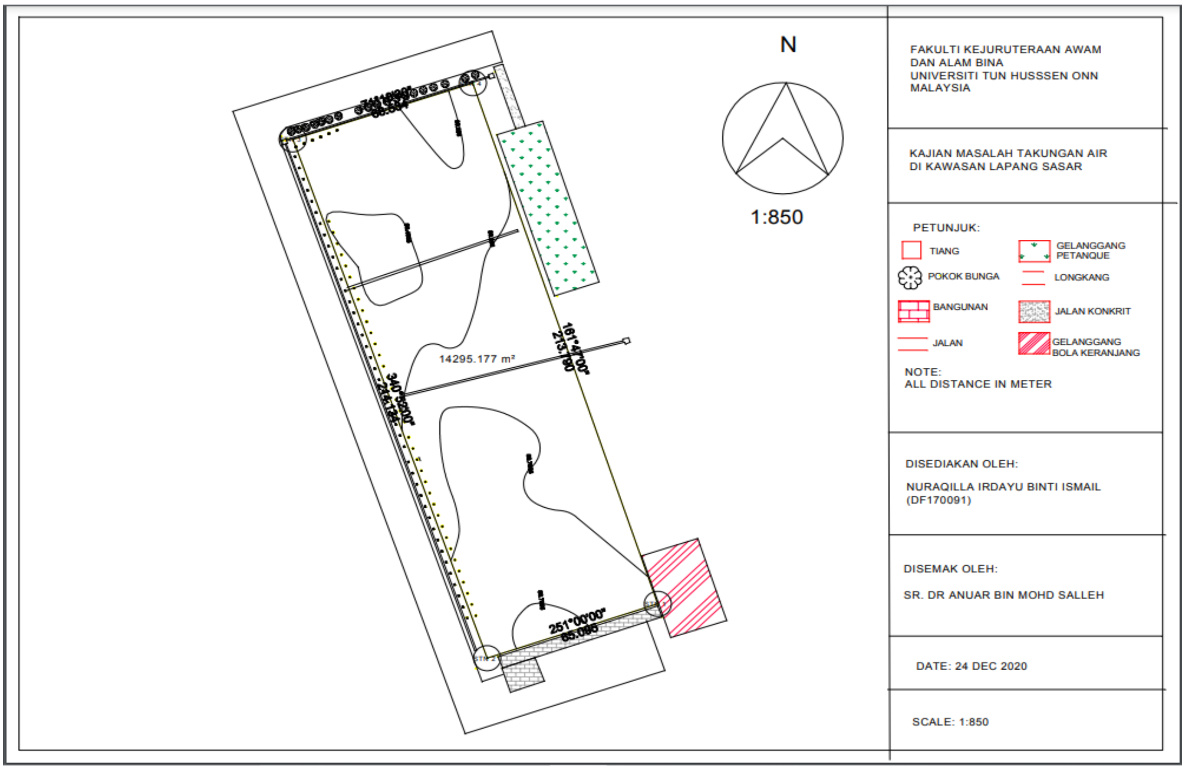

Figure 6: Plan Tacheometry in Golf Driving Range

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